Astronomia BRITANNICA,

Exhibiting

The Doctrine of the Sphere, and Theory of the Planets Decimally by Trigonometry, and by Tables.

Fitted for the Meridian of *LONDON*, according to the *Copernican* Systeme As it is illustrated by *Bullialdus*, and the easie way of Calculation, lately published by Doctor *WARD*.

By JOHN NEWTON, *M.A.*

LONDON,
Printed for the Author, by *R.* and *W. Leybourn*, and are to be sold by *Thomas Pierrepoint*, at the Sun in St. *Paul's* Church-yard, 1657.

MVSEVM
BRITAN
NICVM

6 Ne

To the Right Honourable

ROBERT

Earl of WARWICK, Baron of LEES, &c.

RIGHT HONOURABLE,

AS it were preſumption in me, to think, that I have any thing in my ſelfe, that is worthy the preſenting to your Honour: ſo it were injuſtice to keep from you, that which is your own; He that is once an Admiral, hath ſo great an intereſt in the Sea, that of neceſſity he muſt have ſome in the Stars alſo, becauſe *Nævigation* without *Aſtronomy* is very lame and defective. The compaſs I know is the Sea-mans beſt di-

rection when the weather is foul, but the Sun is found a better when it is faire, yea, ſerveth to correct the errors committed by the other; unleſſe his place therefore be rightly known, our Sea-men, how otherwiſe skilfull ſoever, will be many times troubled to ſteer their courſe aright: This then (without prejudice to other mens endeavors) is that which I aim at, and do believe I have effected, as with more eaſe, ſo alſo with more exactneſs, then thoſe who have written before me, and that not only in relation to the Sun, but alſo to the Moon and other Planets, the truth of which Time only can diſcover, & muſt be therefore waited for. And now that theſe endeavors of mine may in the mean while receive ſome ſhelter from the envious, through your Honors protection, is the humble ſuit of him that is

Your Honours to diſpoſe of
JOHN NEWTON.

To the Courteous READER.

Courteous Reader,

AS there is no part of Mathematicall learning more excellent, ſo is there none more difficult then this of *Aſtronomy*, it hath for ſome thouſands of yeares been much ſtudied, and not without great expence of treaſure, brought to that perfection, in which we now enjoy it; nor can we expect, that thoſe miſtakes, to which this noble Science is yet too often lyable, ſhould ever be redreſſed, without the expence of more; and hard it is to perſwade the men of this earthly-minded age, to look higher then the earth they tread upon, and wallow in; they will not look ſo high as Heaven themſelves, nor give encouragement unto thoſe that would; but that our Students ſhould neglect the benefit of that knowledg they might enjoy; that they ſhould be in love with thoſe difficulties they might avoid, in a ſtudy that is too intricate and difficult at the beſt, can never be ſufficiently admired.

It is therefore our chief and principal aime to ſhew how much

much of trouble may be avoyded in computing the motions of the heavenly bodies; if only the form of our Tables were changed from *Sexagenary* into *Decimall*, the excellency of *Decimal Arithmeticke* will in part appeare, if wee but consider the manner of working, in our *Sexagenary Canons of naturall Sines and Tangents*, in which (to avoid the vast trouble, if not almost the impossibity of working with a Canon that should consist of vulgar Fractions) the Sine and Tangent of every minute is nothing else but the *Decimall* of a Unite; and this that famous Mathematician of our age Mr. *Henry Brigges* did well perceive, when (having perfected that noble invention of Logarithms, first found out by the Right Honourable, *John*, Lord *Neiper*, Baron of *Merchiston* in *Scotland*) he tooke the paines to make a new Canon of Sines and Tangents, dividing the degrees into Decimals, as well as the parts of the Radius answering unto those degrees; and according to which Canon, Mr. *Henry Gillebrand* did since prepare a Treatise of Astronomy for the Presse, but his death prevented the publication: To these I may adde Mr. *William Oughtred*, who is the present wonder of our age, for his extraordinary knowledge in this kind of learning, who in his *Clavis Mathematica*, doth not only wish that this *Decimall* form were observed in all *Astronomical Canons*, but hath also lately professed, that he ever found so much trouble in the *Sexagenary* way, that he took the pains to turn the Equations in the *Rudolphin* Tables into Decimals before he used them; besides the trouble of Reduction this advantage our Decimal Tables have above the Sexagenary, that in finding the part proportional, the halt of your work is done before you begin, there being a necessity both of Multiplication and Division, in Sexagenary numbers, but here of Multiplication onely, or onely of Division.

And now that this wonderful ease in calculation, commended

mended to us by theſe famous men, might not ſtill lie buried in oblivion, & that our Artiſts might be no longer enforced to uſe thoſe labyrinthical Tables in the *Sexagenary* form, we have adventured to publiſh theſe, which never ſhould have ſeene the light, if there had been any hope of thoſe which Mr. *Gillebrand* did long ſince compoſe, or that Mr. *Moore* could have found encouragement to have publiſhed his, or that any other could have been perſwaded to this Decimal form.

The eaſe then that is in the form of our Tables, is in truth the reaſon for which we have undergone this labour, and yet the method of Calculation, which Dr. *Ward* profeſſor of Aſtronomy in *Oxford* hath lately publiſhed (in his Book entituled *Inquiſitio in Bullialdi Aſtronomiæ Philolaicæ fundamenta*) and which we have uſed in the compoſure of our Tables, is ſo brief, ſo eaſie, and ſo exact, as that a better is not to be expected. I am not ignorant, that ſome (which have a deſire to make others and themſelves work) are not therewith ſatisfied, they will rather take the pains of ſeven or eight operations, and yet the æquation at laſt found, is not ſo legitimate as that wch here we find at one; of which there needs no other proof then the Geometry of our Method, our very Enemies being Judges; yet all that we ſhall promiſe is the places of the Planets *properverum*, at a cheaper rate; if we do fail of their true Phenomenon, it ſhall be with leſs trouble and expence of time. Our *Middle-motions*, *Aphelions*, *Excentricities*, and *Dimenſions* of the ſeveral Orbs mentioned in the enſuing Treatiſe, we have borrowed from *Bullialdus*, the method by which they are computed is the ſame in all, and therefore as to the *Excentricities* & *Aphelions*, we thought it ſufficient to inſtance in the Sun or Earth: and for the proportions between the Earths Orb, and the Orbs of the other Planets with their angles of Inclination, we have given an

Example

Example in *Saturn* only, and refer you to *Bullialdus* for the reſt. And although this method of his be not Geometrically true, yet knowing no better; we have contented our ſelves with his, untill there be a better found; and to make his *Middle-motions* to us more uſeful; we have reduced their *Epoches* to the Meridian of *London*, the moſt famous City of this our Iſland of *Great Britain*: For which reaſon, and for the eaſineſs of the calculation which our own Country-man hath invented, and we here uſed, the Treatiſe it ſelfe doth carry the ſtyle of *Aſtronomia Britannica*.

And whether this method of finding the firſt inequality will agree with obſervation, cannot be known; until a Geometrical way of finding the *Excentricities* & *Aphelions* of the Planets in an Ellipſis be alſo propounded to us; and if at laſt, when all things in this *Elliptical Aſtronomy* ſhall geometrically be demonſtrated, the places of the Planets thus found ſhall not agree with obſervation, it will be hard to ſay in what particular the fault doth lie, and therefore we muſt not then impute it to the firſt inequality, much leſſe now, when the Geometry of that is demonſtrated, & other parts are defective, but a new *Hypotheſis* muſt be thought of; and until this ſhall be effected, as there are no Tables extant, by which the places of the Planets can be computed with ſo much eaſe, ſo none can be expected, by which their places may be computed with more probability of truth, then by theſe which wee muſt now ſubmit to thy cenſure, and do commend to thy peruſal.

JOHN NEWTON.

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The Preface.

ALL Propoſitions Aſtronomical and Aſtrological, have ſome dependence on the Sphere or Globe, for the better underſtanding therefore of that which follows, it is fit that the Reader be ſomewhat acquainted with the doctrine thereof; that he know at leaſt what a Globe is, and what the lines, circles and arches uſually drawn thereon do repreſent. Now a Globe or Sphere, is an Analogical repreſentation either of the Heavens or the Earth.

And in this Sphere or Globe there are ten imaginary circles whereof there are ſix great and foure ſmall. A great circle is ſuch a one as divideth the body of the Globe into two equal Hemiſpheres. And a ſmall circle is that which divideth the ſame, into two unequal Hemiſpheres, wherof the one is more, the other leſs then half the body of the Globe or Sphere.

The ſix great circles are theſe. 1 The Horizon. 2 The Meridian. 3 The Equinoctial. 4 The Zodiack. The fifft and ſixt are the two colures.

The four leſſer circles are, 1 The Tropick of *Cancer*. 2 The Tropique of *Capricorn*. 3 The circle *Artick*. 4 The circle *Antartick*. And are all expreſt in this annexed Diagram.

1 The Horizon wch is alſo called the *Finiter*, is a circle which

divideth the visible part of the Heavens from the not visible that is the lower Hemisphere from the higher, in the figure noted with A B.

2 The *Meridian* is a circle which passeth by the Poles of the World, and through the Zenith and Nadir, and is marked with A Z B N.

3 The *Equinoctial* is a Circle which divideth the whole Sphere into two equal parts, and is therefore equally distant from both the Poles, to which when the Sun cometh (which is twice in the Year) the Dayes and Nights are of equal length all the World over, this circle is noted with E F.

4 The *Zodiack* is a great circle which conteineth the 12 Signes, cutting in the very middle the Equinoctial in two points, which are the beginning of *Aries* and *Libra*, whereof the one half. *viz.* six Signes decline from the Æquator to the North Pole, and are therefore called the Northern Signes, as *Aries* ♈, *Taurus* ♉, *Gemini* ♊, *Cancer* ♋, *Leo* ♌, *Virgo* ♍. The other six decline towards the South Pole and are therfore called the Southern Signes, as *Libra* ♎, *Scorpio* ♏, *Sagittarius* ♐, *Capricornus* ♑, *Aquarius* ♒, *Pisces* ♓.

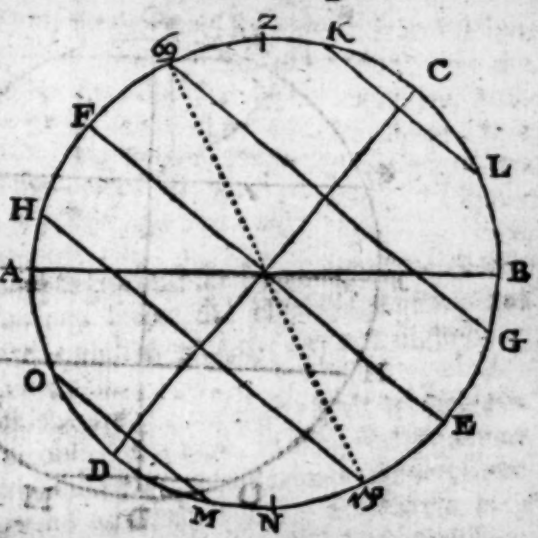
5 The one of the *Colures* which dividing the Sphere into two parts passeth by the Poles of the World and the two Equinoctial points, called the Equinoctial Colure, and marked with C D.

6 The other *Colure* which dividing the Sphere also into two equal parts, passeth by the beginning of *Cancer* and *Capricorn*, and the Poles of the World, called the Solstitial Colure, and is the same with the Meridian as the Sphere is here projected.

7 The Tropick of *Cancer* is one of the lesser circles distant from the Equinoctial towards the North Pole 23 deg. 31 min. 30 seconds, or in Decimal Numbers, 23 deg. 525, to which when the Sun cometh he causeth the longest day, and shortest night to all Northern, the shortest day and longest night

night to all Southern inhabitants, and is noted with G ♑.

8 The Tropick of *Capricorn* is a circle distant from the Equinoctial towards the South Pole: 23 deg. 31 min. 30 seconds, or in Decimal numbers, 23 deg. 525 parts, to which when the Sun cometh, he maketh the longest day and shortest night, to all Southern the shortest day & longest night to all Northern Inhabitants, and is noted, with H ♑. These two circles are called of the *Greeks* τροπικοὶ ἀ *convertendo*, because when the Sun toucheth any of these circles, he is at his greatest distance from the Æquator, and returneth thither again.



9 The *Artick* circle is distant from the North pole of the world as much as the Tropick of *Cancer* is distant from the Equinoctial, and is noted with K L.

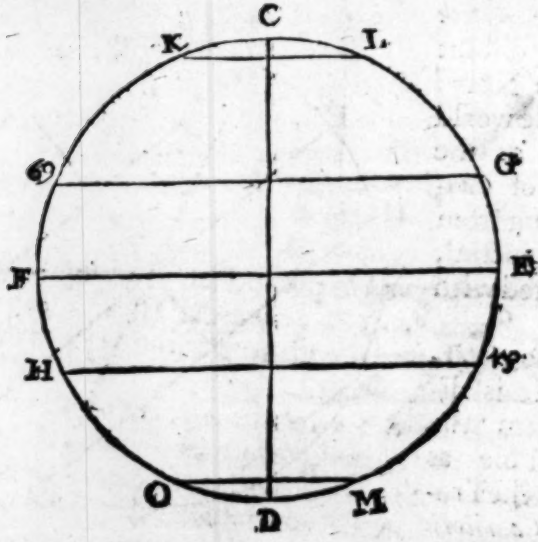
10 The *Antartick* circle is distant from the South Pole as much as the Tropick of *Capricorn* is distant from the Æquator, and is noted with O M.

Besides these circles expresst upon the Globe, there are other circles not expresst, that are also in familiar use; but these being sufficient for our intended matter, omitting the rest, we will now speak of the several affections of the Sphere or Globe, and so proceed to practice.

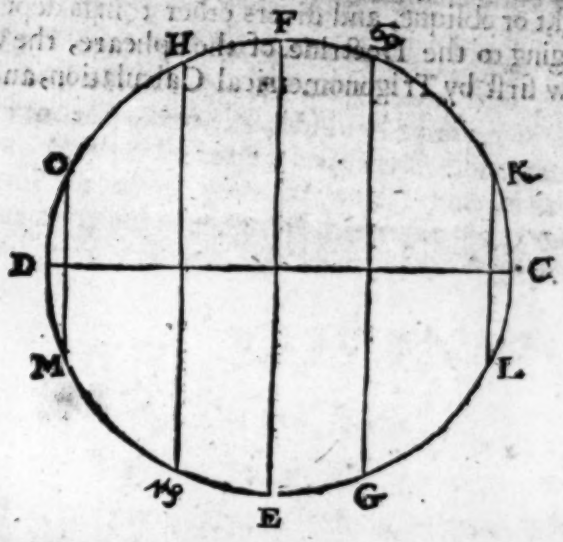
According to the diverse habitude of the Æquator to the Horizon (which is either Paralel to it, or else cutteth it, and that either

either in right or oblique angles) there is a threefold position or Situation of Spheres.

The first is of those that have either Pole for there Zenith or vertical point, with these the Æquator and Horizon are Parallel to each other, or rather indeed do make but one circle between them; and this is called a Parallel Sphere, and they which there inhabit (if any such be) see not the Sun or other Star either rising or setting, or higher or lower, in their diurnal revolution.



Besides seeing that the Sun traverseth the whole Zodiack, in a Year, and that half the Zodiack is above the Horizon, and half under it, it comes to pass, that the Sun setteth not with them for the space of six moneths, nor giveth them any light, for the space of other six moneths, and so maketh but one artificial day and night of the whole Year. The second position of the Sphere is of those whose Zenith is in the Æquator, and this is called a right Sphere, in which all



all the Stars are obſerved to riſe and ſet in an equal ſpace of time, and to continue as long above the Horizon, as they do under it, as by the figure it doth appear, the day and night being alwayes of an equal length.

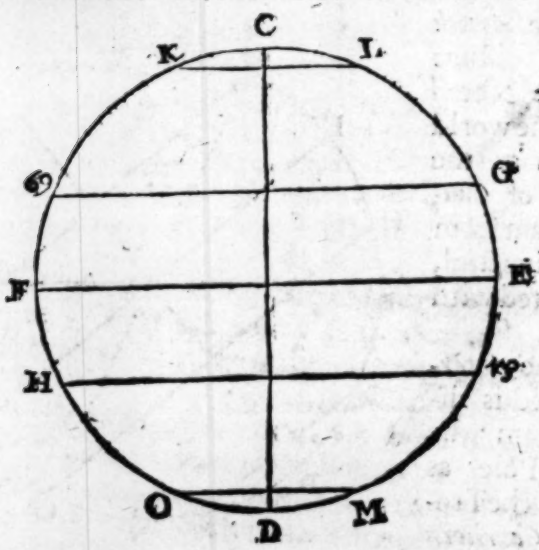
The third poſition of the Sphere agreeth to all other places elſe, and is called an oblique Sphere, in which the dayes are ſometimes longer then the nights, ſometimes ſhorter, and ſometimes of equal length: when the Sun is placed in the Equinoctial point, the dayes and nights are equal, but when he declineth from the Æquator, the dayes are obſerved to increaſe, and when he declineth towards the oppoſite Pole the dayes decreaſe, as it is manifeſt in the firſt figure.

And thus having briefly ſhewed, what a Globe is, the lines thereon deſcribed, with the ſeveral affections belonging thereunto, what remayneth but that we now proceed to practice, & ſhew there uſe as to the matter in hand; which is to find

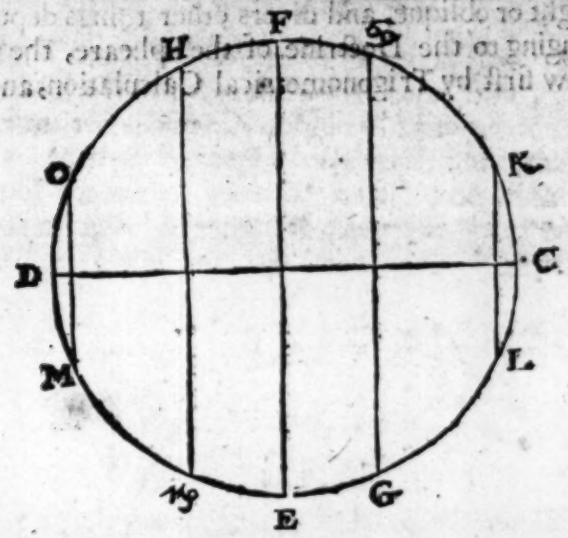
the

either in right or oblique angles) there is a threefold poſition or ſituation of Spheres.

The firſt is of thoſe that have either Pole for there Zenith or vertical point, with theſe the Æquator and Horizon are Parallel to each other, or rather indeed do make but one circle between them; and this is called a Parallel Sphere, and they which there inhabit (if any ſuch be) ſee not the Sun or other Star either riſing or ſetting, or higher or lower, in their diurnal revolution.



Beſides ſeeing that the Sun traverſeth the whole Zodiack, in a Year, and that half the Zodiack is above the Horizon, and half under it, it comes to paſs, that the Sun ſetteth not with them for the ſpace of ſix moneths, nor giveth them any light, for the ſpace of other ſix moneths, and ſo maketh but one artificial day and night of the whole Year. The ſecond poſition of the Sphere is of thoſe whoſe Zenith is in the Æquator, and this is called a right Sphere, in which all



all the Stars are obſerved to riſe and ſet in an equal ſpace of time, and to continue as long above the Horizon, as they do under it, as by the figure it doth appear, the day and night being alwayes of an equal length.

The third poſition of the Sphere agreeth to all other places elſe, and is called an oblique Sphere, in which the dayes are ſometimes longer then the nights, ſometimes ſhorter, and ſometimes of equal length: when the Sun is placed in the Equinoctial point, the dayes and nights are equal, but when he declineth from the Æquator, the dayes are obſerved to increaſe, and when he declineth towards the oppoſite Pole the dayes decreaſe, as it is manifeſt in the firſt figure.

And thus having briefly ſhewed, what a Globe is, the lines thereon deſcribed, with the ſeveral affections belonging thereunto, what remayneth but that we now proceed to practice, & ſhew there uſe as to the matter in hand; which is to find the

the Declinations and Ascensions of the Sun and other Stars whether right or oblique, and divers other things depending on, or belonging to the Doctrine of the Spheare, the which we will shew first by Trigonometrical Calculation, and then by Tables.

A

Aſtronomia *BRITANNICA:*

The firſt Book.

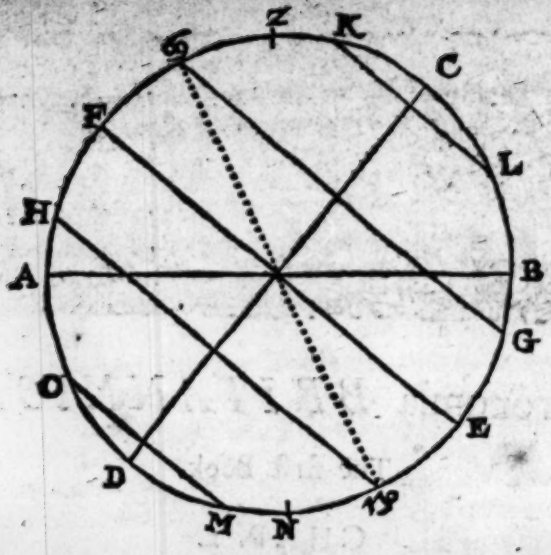
CHAP. 1.

To find the Suns greateſt Declination, and the Poles Elevation.

THe Declination of a Planet, or other Star is his diſtance from the Æquator, and as he declines from thence, either Northward or Southward, ſo is his declination denominated North or South. And becauſe that all the Planets (the Sun onely excepted) do move ſometimes in and ſometimes out of the Ecliptick beſides their declination North or South from the Æquator, they have alſo latitude North or South from the Ecliptique, while the Planets keep in the Ecliptique, one rule will ſerve to find their Declination, as well as the Declination of the Sun, but if they have either North or South latitude, there muſt another rule be given, in both which rules the greateſt Declination of the Sun is ſuppoſed to be known, and firſt therefore we will ſhew how, that may be found inſtrumentally, and then compute the Declination of a Planet or other Star, with latitude or without.

For the finding the Suns greateſt Declination, you muſt by a Quadrant or other Inſtrument, take his greateſt and his leaſt Meridian altitude; the difference between which altitudes is the diſtance of the Tropiques, and half the diſtance of the Tropiques, is the quantity of the Suns great Declination, as by the following Figure it ſhall appear. In which A Z B N repreſents the Meridian, E F the Æquinoctial, G H the Zodiack, the

North



North pole D the South A B the Horizon Z the Zenith, N the Nadir, ♋ G a parallel of the Suns Diurnall motion at ♋, or the Suns greateſt Declination from the Equator towards the North Pole. From whence it is apparent that from A to ♋ is the Suns greateſt Meridian altitude from A to H his leaſt, if therefore you deduct A H the leaſt Meridian altitude from A ♋ the greateſt, the difference H ♋ is the diſtance of the Tropiques, and becauſe the angles ♋ center F and ♑ center E are equal, therefore the Suns greateſt Declination towards the South Pole is equal to his greateſt Declination towards the North, and conſequently halfe the diſtance of the Tropiques, or the arch that is the arch ♋ F is the quantity of the Suns greateſt declination. And then if you deduct the Suns greateſt declination or the arch A ♋ F from the Suns greateſt Meridian altitude or the arch A ♋ the difference wil be A F or the height of the Æquator above the Horizon, the complement whereof to a quadrant is the arch A D equal to C B the height of the Pole.

Example.

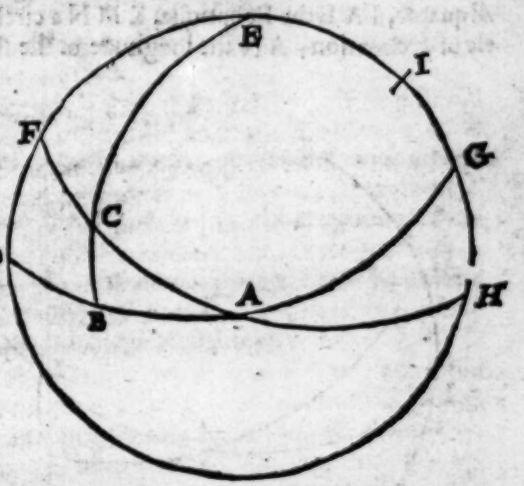
The Suns greateſt Meridian altitude taken, *June* 11 at *London*	61,99167
The Suns leaſt Meridian altitude, *December* the 10th.	14,94167
Their difference is the diſtance of the Tropiques	47,05000
Half that difference is the Suns greateſt Declination whoſe difference from the greateſt altitude is	23,52500
The elevation of the Equator and the complement thereof to 90 is the Elevation of the Pole	38,46667 / 51,53333

CHAP.

CHAP. 2.

The Suns greateſt Declination being given, to find his Declination in any point of the Ecliptique.

LEt DFHG repreſent the Solſtitial Colure, D BAG the Equator, F A H the Ecliptique, I the Pole of the Ecliptick, E the pole of the Equator, E C B a meridian line paſſing from E, through the Sun at C, and falling upon the Equator D A G with right angles at the point B. Therefore in the Rectangle ſphæricall Triangle A B C we have known. 1 The Hypothenuſe A C the Suns diſtance from the next Æquinoctiall Point, whether Aries or Libra and may be ſuppoſed to be in 10 degrees of Cancer, and that being neerer unto Libra then Aries, I take his diſtance from Libra which is two ſigns and 20 degrees, or 80 degrees.



2. We have known the angle B A C the Suns greateſt declination, which by the accurate Obſervation of *Tycho* is found to be 23 deg. 31 minutes and 30 ſeconds. And in Decimall numbers 23. 525. Hence to find the preſent declination the proportion is,

As the Radius is to the ſine of the Suns greateſt declination. So is the ſine of the planets diſtance from the next Æquinoctiall point, To the ſine of the declination required.

And by this proportion, together with the help of the Canon of artificiall ſines and tangents, I find the declination of the Sun at the time propoſed thus. Firſt, I ſeek for the ſine of Radius or 90 degrees, the meaſure of the right angle at B, and I find the ſine thereof 10,000000, next I ſeeke the ſine of 80 degrees, and likewiſe the ſine of 23,5250, theſe two I adde

 together

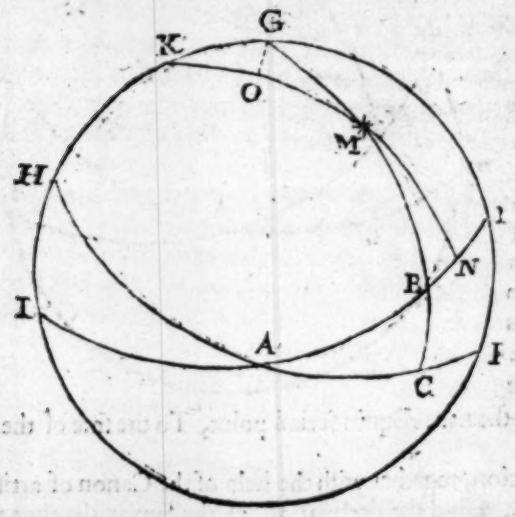
together and from their aggregate, I substract the Radius and what remaineth is the sine of the declination sought, as in the following work you may perceive.

As Radius		
To the sine of B A C	23.525	9,6011352
So sine of A C	70.	9,9729858
To the sine of B C	22.02910	9,5741210

CHAP. 3.

How to find the Declination of a planet or fixed Star with Latitude.

What the Declination of a planet is, and how to find the same in any point of the Ecliptique hath been already shewed, we will now shew how to finde the same with latitude either north or south, and for demonstration sake. Let G F I H represent the Solstitial Colure, H A F the Æquator, I A E the Ecliptique, K M N a circle of latitude, G M C a circle of declination, A N the longitude of the star, M C the declination.



Then in the Oblique angled spheical Triangle M G K we have limited. 1 The side K G the Suns greatest declination. 2 The side K M the complement of latitude. 3 The angle M K G the complement of longit. From hence the declination M C may be found at two operations, for first to find K O the proportion is,

As the Radius to the Cosine of the complement of Longitude, so is the tangent of the Suns greatest declination, To the tangent of the first arch: K O, which being added to or substracted from the complement of Latitude K M, according to the direction ollowing their aggregate or difference will be the arch O M. If:

If the Declination ſought be in the

Northerne Signes and
- North Latitude, ſubſtract the arch found from the complement of latitude and what remaineth is the ſecond Arch O M.
- South Latitude add the arch found to the complement of latitude and their aggregate is the ſecond arch if leſſe then a quadrant, but if more the complement thereof to a ſemicircle.

Southern Signes and
- North Latitude, adde the arch found to the complement of Latitude, and their aggregate is the ſecond arch.
- South latitude ſubſtract the arch found from the complement of latitude, and what remaineth is the ſecond arch.

And then the ſecond proportion is,

As the Coſine of the firſt arch found, Is to the coſine of the Suns greateſt declination, So is the Coſine of the ſecond arch found, to the Coſine of an arch, whoſe complement is the declination ſought: To make it plain we will in each caſe adde an example.

In the firſt Quadrant.

We will ſuppoſe a ſtarre to be in 10 deg. of *Gemini*, with 4 deg. of north latitude.

The longitude of a ſtarre ſo poſited is 70 deg. the complement thereof M K G is 20 deg.

The latitude 4 deg. north, the complement thereof 86 M K. And the Suns greateſt declination K G 23 deg. 5250.

Then according to the former analogie, firſt I ſay,

As the Radius 90.	10,000000
To the Coſine of M K G 20.	9,97129858
So is the tangent of K G 23. 52 50	9,63881 98
To the tangent of K O 22. 25	5,61118056
The complement of latitude	90 s, 86 d. 00
The arch K O	22 25
Their aggregate	108 25
Their difference	63 75

Becauſe the latitude is North I take their difference and ſay,

As the Coſine of K O :	22. 25	9,9663954
To the Coſine of K G	23. 5250	9,9623154
So is the Coſine of O M :	63. 75	9,6457058
To the Coſine of G M :	64. 01	9,6416258

The complement thereof 25.99 is the declination ſought.

To find the declination of the ſame point with 4 degrees of South latitude: I take the complement of 108. 25. *viz.* 71.75.

And ſay as the Coſine of K O	22. 25.	9,9663954
To the Coſine of K G	23. 5250	9,9623154
So the Coſine of O M	71. 75	9,4957715
To the Coſine of G M	71. 93	9,4916915

whoſe complement is the declination ſought, *viz.* 18. 7.

The point of the Ecliptique anſwering hereunto in the 2 quadrant, is the 20 of *Cancer*, and hath the ſame declination North and South. In the third and fourth quadrant the 10 of *Sagittary*, and the 20 of *Capricorn*, have the ſame declination, but with contrary latitude.

In the ſecond Quadrant.

We will ſuppoſe a ſtarre in 10 deg. of *Leo* whoſe longitude is 130. The latitude 4 deg. north.

The complement of longitude M K G is 50, but becauſe the longitude is more then a quadrant, I take the complement of 50, *viz.* 40 deg. The complement of latitude M K is 86 as before. And the Suns declination fixed, firſt then I ſay,

As the Radius 90	10,0000000
To the Coſine of M K G 40	9,8842539
So the tangent of K G 23. 5250	9,6388198
To the tangent of K O. 18.44	9,5230737
The complement of latitude	86.00
The arch K O	18.44
Their aggregate	104.44
Their difference	67.56

For the north latitude I take their difference and ſay,

As the Coſine of K O 18. 44	9,9771084
To the Coſine of K G 23. 5250	9,9623154
So the Coſine of O M 67. 56	9,5817400
To the Coſine of G M 68. 35	9,5669470

whoſe complement 21. 65 is the declination ſought.

For

For the declination of the ſame point with South latitude, I take the complement of 104.44. *viz.* 75.56. And ſay,

As the Coſine of K O 18. 44	9,977 1084
To the Coſine of K G 23. 52.50	9,9623154
So the Coſine of O M 75. 56	9,3968372
To the Coſine of G M 76. 05	9,3820442

whoſe complement 13. 95 is the declination with South latitude

The point of the Ecliptique anſwering hereunto in the firſt quadrant is the 20 of *Taurus*, and hath the ſame declination North latitude North and South.

In the third and fourth Quadrants the points anſwering thereunto are the 20 of *Scorpio* and the 10 of *Aquarius*, and have the ſame declination but with contrary latitude.

CHAP. 4.

How to find the Right Aſcenſion of any point of the Ecliptique.

THe Aſcenſion of the Sun or Starres is the degree of the Æquator that riſeth with the ſame above the Horizno. And the Deſcenſion of it is the degree of the Æquator that goeth under the Horizon with the ſame, both theſe are either Right or Oblique. The Right Aſcenſion or Deſcenſion is the degree of the Æquator that Aſcendeth or Deſcendeth with the Sun or other ſtarre in a Right Spheare, and the Oblique Aſcenſion is the degree of the Æquator, that aſcendeth or deſcendeth with the ſame in an oblique ſpheare. The former of theſe is ſimple, and of one kind onely; becauſe there can be but one poſition of a Right ſpheare, but the later is various and manifold according to the diverſe inclination of the ſame. To find the Right Aſcenſion of a planet in the Eclptique, There muſt be given as in the firſt Chapter, the planets longitude or diſtance from the next Equinoctiall point: and the Suns greateſt declination. Then in the Rectangle ſphearicall Triangle of the firſt chapter A B C, we have limited.

1 The angle B A C, the Suns greateſt declination 23.31.30.

2 The Hypothenuſe A C, the Suns diſtance from the next Equinoctiall point, whoſe place we will ſuppoſe to be in 10 degrees of *Gemini*, and conſequently his diſtance from *Aries* is 70 degrees. Hence to find the baſe A B, the right Right Aſcenſion the point ſought, the proportion is.

As the Radius is to the tangent of the planets diſtance from the next Æ-

qui-

quinoctiall point: So is the Cosine of the Suns greatest declination to the tangent of the Right Ascension of the point sought, *Example.*

As the Radius 90	10,0000000
To tangent of A C 70.	10,4389341
So is the Cosine of B A C 23.5250	9,9623154
To the tangent of A B 68.34874	10,4012495

which is the Right Ascension of the Sun or any other planet without latitude, when they be in the the 10 degree of *Gemini.*

Note that if the Right Ascension of the point sought be in the second quadrant (is in *Cancer, Leo, Virgo.*) you must take the complement of the arch found to a semicircle: if in the third Quadrant (as in *Libra, Scorpio, Sagitarius*) you must add a semicircle to the arch found: if in the last quadrant (as in *Capricorn, Aquarius, Pisces*) you must substract the arch found from a whole circle or 360, and so shall you have the Right Ascension of any point of the Ecliptique, to make it plaine we will in each case add an Example.

In the second Quadrant.

Let the Right Ascension of the point sought be 10 degrees of *Virgo*, the distance thereof from *Libra*, which is the next Æquinoctiall point is 20 degrees, acccording therefore to the former Analogie, I say.

As the Radius	90.	10.0000000
To the tangent of A C	20.	9.5610658
So is the cosine of B A C	23.5250	9.9623154
To the tangent of A B	18.45	9.5233813

whose complement to a semicircle 161.55 is the Right Ascension thereof.

In the third Quadrant.

Let the Right Ascension of the point sought be in 14 degrees of *Scorpio*, the distance thereof from *Libra*, the next Æquinoctiall point is 44 degrees. Therefore I say.

As the Radius	90.	10.0000000
To the tangent of A C	44.deg.	9.9848371
So is the Cosine of	23.5250	9.9623154
To the tangent of A B	4152	9.9471525

to which if you adde a semicircle or 180 degrees the Right Ascension of of the point sought will be 221.52.

In

In the last Quadrant.

Let the Right Ascension of the point sought, be 22 degrees of *Aquarius*; the distance thereof from *Aries*, which is the next Æquinoctiall point is 38 degrees. Therefore I say.

As the Raduis	90.	10.000000
To the Tangent of A C	38.	9.8928098
So is the Cosine of	23.5250	9.9623154
To the tangent of A B	35.62	9.8551252

which being subtracted from 360 there rests 324. 38 for the Right Ascension of the point sought.

CHAP. 5.

How to finde the Right Ascension of a Planet or other Star with Latitude.

THe Declination being found by the 3 Chapter, we have in the oblique angled Sphericall Triangle of that Diagram G K M all the sides given with the angle M K G, therefore to finde the angle K G M, say. As the Cosins of the declination, is to the Cosine of the Planets distance from the next Æquinoctiall point. So is the Cosine of its latitude to the Cosine of its Right Ascension.

For Example. The Declination of 10 degrees of *Gemini*, was found to be 25.99. with 4 degrees North Latitude. Whose complement is G M. 64.01 the complement of Longitude is the angle M K G 20, the complement of Latitude is M K 86, hence to finde the Right Ascension, the Analogie is.

As the Sine of G M	64. 01. *co. arith.*	0.0463059
To the sine of M K G	20.	9.5340516
So is the sine of K M	86.	9.9984407
To the sine of K G M.	22.28	9.5787982

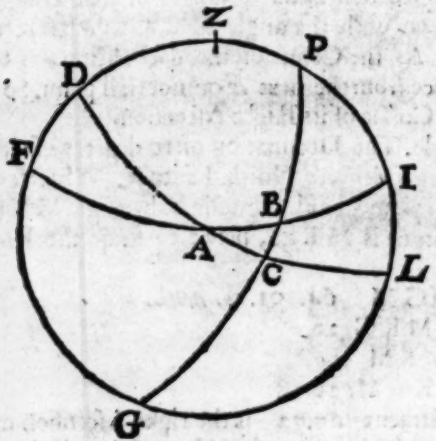
whose complement 67.72 is the right Ascension of a Star in 10 degrees of *Gemini*, with 4 degrees of North Latitude.

CHAP.

CHAP. 6.

The Elevation of the Pole and Declination of the Sun given, to find his Amplitude.

THe Amplitude of the Suns riſing or ſetting is an arch of the Horizon intercepted betwixt the Æquator and the place of the riſing and ſetting of the Sun. And it is either Northern or Southward, the Northern Amplitude is when he ſets and riſeth on this ſide of the Equator, toward he North Pole: and the Southern when he ſets or riſeth on the contrary ſide. Now when the Sun is in the Æquator, he hath no Amplitude at all: but when he is in the Solſtitial points, he hath then the greateſt Amplitude. That we may find then the Suns amplitude or diſtance from the Eaſt or Weſt points at the time of his riſing or ſetting; let D P L G F repreſent the Meridian, F A I the Horizon, D A L the Equinoctial, P the Pole of the Æquator.



Then in the Rectangle Spherical Triangle A B C, let there be given the angle B A C or complement of the Poles elevation, 38.47 and B C the Suns Declination 23.15. To find A B the Suns Amplitude, The Analogie is,

As the ſine of B A C.	38.47. *co.ar.*	0.2061365
To Radius.	90.	10.0000000
So is the ſine of B C.	43.15.	9.5945468
To the ſine A B	39.19.	9.8006833

CHAP. 7.

The Meridian Altitude and Declination of the Sun with the Poles Elevation given to finde his true place in the Zodiac.

IF the Meridian Altitude of the Sun be leſſe then the complement of the Poles elevation, ſubtract the meridian altitude from the height of the Æquator, and what remaineth is the Suns Declination towards the South Pole; But if the Meridian altitude of the Sun be more then the height of the Æquator, ſubtract the height of the Æquator from the Meridian altitude and what remaineth is the Suns Declination towards the South Pole.

Then in the Diagram of the ſecond Chapter, in the right angle Sphæricall Triangle A B C, we have known, the angle B A C the Suns greateſt Declination, and the perpendicular B C the preſent Declination to finde the Hypothenuſe A C, the Suns diſtance from the next Equinoctiall point, or true place in the Zodiac, for which the Analogie is.

As the ſine of B A C.	23.5250 *co.ar.*	0.3988648
To the ſine of B C.	23.15	9.5945468
So is the Radius or whole ſine.	90.	10.0000000
To the ſine of A C	80.04	9.9934116

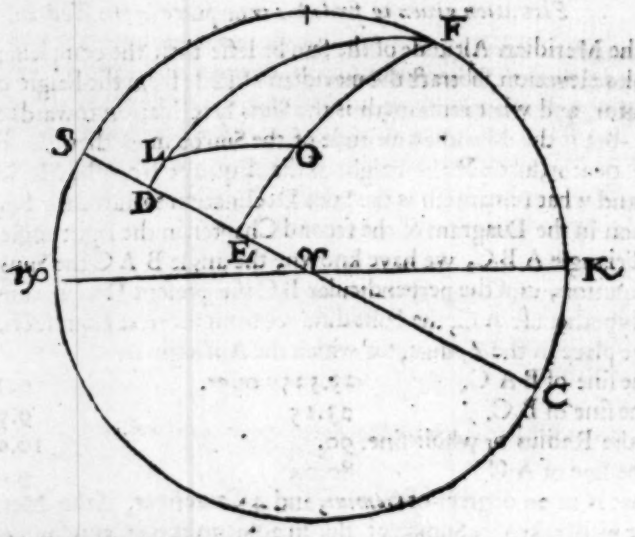
That is in 20 degrees of *Gemini*, and 4 Centeſmes, if the Meridian altitude were taken in Summer: But in 20 degrees 04 Centeſmes of *Capricorn*, if the Meridian altitude was taken in Winter.

CHAP. 8.

Having the Meridian Altitude of an unknown Star and the diſtance thereof from a known Star, to finde the Right Aſcenſion of the unknown Star.

ABout the end of the year 1577. *Tycho* obſerved the diſtance of the litle Star in the breaſt of *Pegaſus* from the bright Star of the Vultur to be exactly 45 deg. 31 min. or in decimal numbers 45.51667. And by the Meridian altitude thereof, he found the Declination to be 22 deg. 26 min. North that is 22.43333. Which given the Right aſcenſion of the ſaid Starre is to be enquired. For the finding whereof in the oblique angled

Sphærleall Triangle (of the annexed Diagram) F O L, there is knowne First, F L the complement of the Declinat. of the bright Star of the Vultur 82.13333. Secondly F O the complement of the Declination of the Star in the brest of *Pegasus*, 67.56667. Thirdly O L the distance of them, 45.51667, to finde the angle at F or difference of their Right ascension.



The side L O.	45.51667.
The side F L.	82.13333.
The side FO.	67.56667.
Sum of the sides.	195.21667.
The halfe Sum.	97.60833.

Sine of F L,	82.13333. co.ar.	0.0041064
Sine of F O.	67.56667. co.ar.	0.0341757
Dif. of F L ½ sum.	15.47500.	9.4262148
Dif. of F O ½ sum.	30.04167.	9.6995164
Quadrat of the sine of halfe the angle.		19.1640133
Halfe is the sine of	22.45453.	9.5820066

Double

Double is the angle L F O. 44.90906. Equall to the arch D E the difference of their Right aſcenſions, which being added to the Right aſcenſion of the bright Star of the Vulture. 292,58333. The ſumme 337.49239 is the Right aſcenſion of the little Star in the breaſt of Regaſus.

CHAP. 9.

Having the Declination and Right aſcenſion of a ſtar given, to finde the longitude and latitude thereof.

IN the Diagram of the 3 Chapter, having the Right aſcenſion of the little ſtar in the breaſt of *Pegaſus* A C. 337.49239. And the declination C M. 22.43333. And the greateſt obliquity of the Ecliptique B A C. 23.5250. we are to enquire its Longitude A N. and Latitude M N. wherefore in the Triangle A B C. we have the angle B A C. 23.5250. and the ſide A C 22.50761 the complement of the Right aſcenſion: then I ſay.

As Radius.
To Tangent of B A C 23.5250 9.6311198
So ſine of A C. 22.50761 9.5827787
To Tangent of B C. 6.46125 9.2217985
Adde C M. 22.43333 The Declination
Sum is M B. 31.89458

when the Declination is South the arch found muſt be ſubtracted from it, and their difference ſhall be M B.

2. To finde the angle A B C.

As the ſine of B C 9.46125 *co.ar.* 0.7841497
To the ſine B A C 23.5250 9.6011352
So the ſine of A C 22.50761 9.5829787
To the ſine of A B C 68.36843 9.9682836

3. To finde the ſide A B.

As the ſine of B A C. 23.52520. *co.ar.* 0.3988648
To the ſine of B C. 9.46125. 9.2158503
So is Radius. 10.0000000
To the ſine of A B. 24.31967 9.6147151

4. The angle A B C is equall to the angle M B N, therefore to finde the latitude M N.

As the sine *M* N B 90.
To the sine of *M* B 31.89458. 9.7229282
So the sine of *M* B N. 68.36843. 9.9682836
To the sine of *M* N. 29.41602. 9.6912118

Lastly, to finde the arch B N.

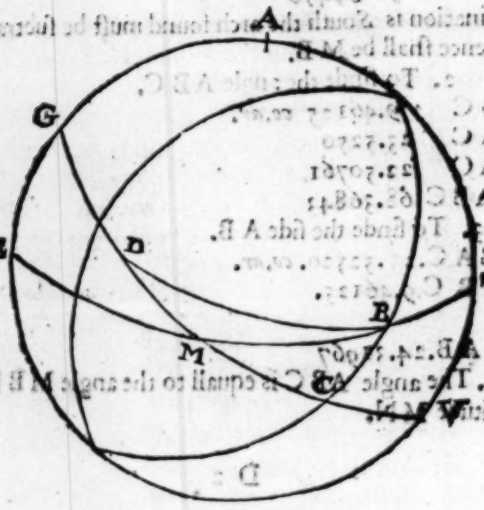
As Radius.
To Cotangent of. *M* B N. 68.36843. 9.5983151
So Tangent of *M* N. 29.41602. 9.7511554
To the sine of B N. 12.92052. 9.3494705

Which is to be added to A B if the Right ascension be lesse then a semicircle, but if the Right ascension exceed 180, as in our example, the Complement of B N. 357.07948, is the longitude desired.

CHAP. 10.

How to finde the Ascensionall Difference.

THe Ascensional Difference, is nothing else but the difference betweene the ascension of any point of the ecliptique in a Right Sphere, and the Ascension of the same point in an oblique Sphære, as in the annexed Diagram, Let A G E V represent the



Meridian, E M T the Horizon, G D M C V the Æquator, D B part of the Zodiac, A the Pole thereof, D the beginning of *Aries*, V T the complement of the Poles elevation, B C the Suns Declination, D C the Right aſcenſion, M C the aſcenſional Difference.

Then in the Right angled ſphæricall Triangle B M C we have limited. 1. The angle C M B the complement of the Pole 38.46667. Secondly, the ſide B C 19 deg. the Suns Declination, hence to finde, the aſcenſional difference M C the Analogie is.

As the Cotangent of the poles Elevation, is to Radius. So is the tangent of the planets Declination, to the ſine of the aſcenſionall difference.

As the tangent of C M B	38.46667. co. ar.	0.1099216
Is to Radius		10.000000
So is tangent of B C	22.8291	9.6070442
To the ſine of M C	30.61613	9.7069577

which is the Aſcenſionall Difference ſought.

CHAP. 11.

How to find the Oblique Aſcenſion or Deſcenſion of any point in the Ecliptique.

OBlique aſcenſion is when a leſs arch or portion of the *Æquator* riſeth, then doth of the Zodiack, or elſe of that Star may be ſaid to riſe obliquely with whom a leſs portion of the *Æquator* aſcendeth above the Horizon, & ſo the oblike Deſcenſion or ſetting of a Star, is when a leſs proportion of the Æquator deſcendeth with it, then doth in a right Sphere.

In the former Diagram, D C repreſents the right Aſcenſion, M C the Aſcenſional Difference, D M the oblique Aſcenſion, D B an arch of the Ecliptique above the Horizon, which being greater then D M, a Star in this poſition of the Sphere, is ſaid to riſe obliquely. The quantity whereof is found, by deducting the Aſcenſional difference C M from the right aſcenſion D C, according to the direction following.

If the Declination be

- North
  - Subt. — The Aſcenſional Difference from the right Aſcenſion, and it giveth the oblique Aſcenſion.
  - Adde — The Aſcenſional Difference to the Right Aſcenſion, and it giveth the oblique Deſcenſion.
- South
  - Adde — The Aſcenſional Difference to the Right Aſcenſion, and it giveth the oblique Aſcenſion.
  - Subt. — The Aſcenſional Difference from the Right Aſcenſion, it giveth the oblique Deſcenſion.

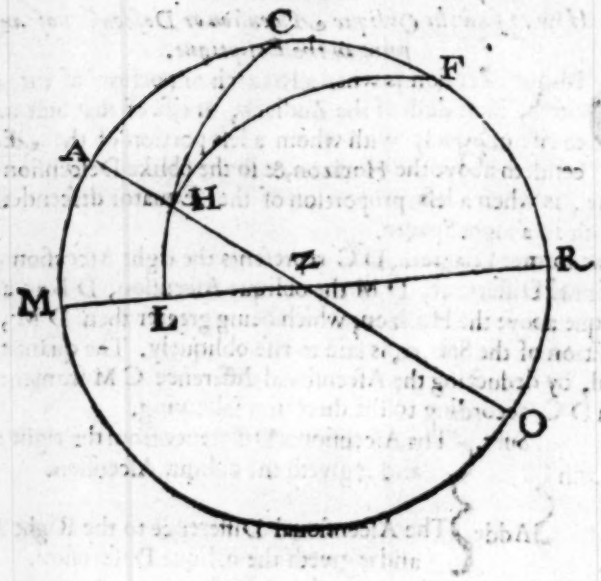
Right

Right Aſcenſion of ten degrees of *Gemini*,	68.[illegible]
Aſcenſional Difference	30.61613
Oblique Aſcenſion of ten degrees of *Gemini*,	37.73261
Oblique Deſcenſion of ten degrees of *Gemini*,	99.08133

CHAP. 12.

The Poles Elevation and the Suns Declination being given, to finde his Altitude at any time aſſigned.

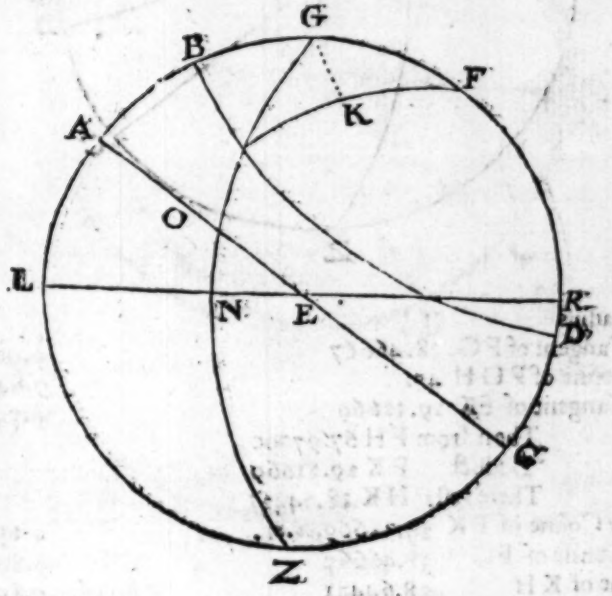
IN this propoſition there are three varieties, firſt, when the Sun is in the Æquator, that is the begining of *Aries* and *Libra*, in which caſe ſuppoſing in this Diagram the Sun to be at H two houres or 30 degrees diſtant from the Meridian A, and the poles Elevation R F equall to A C 51.53333, the angle at A being right, I ſay.



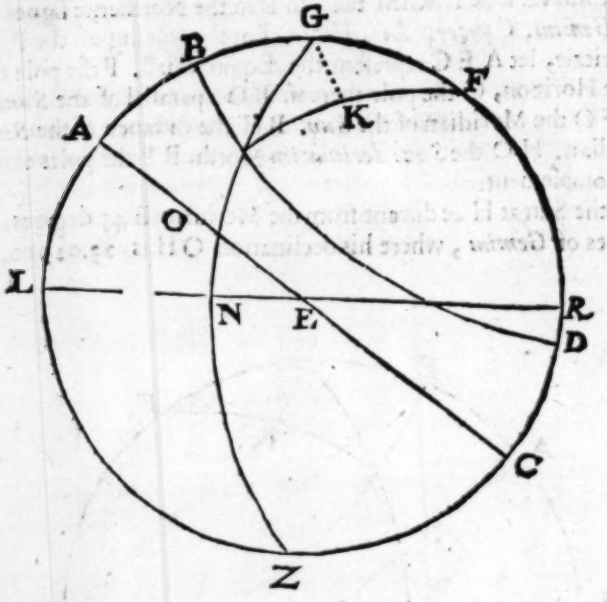
As the Radius.
To the Cosine of A H 30°
So the Cosine of A C 52. 53333
To the Cosine of C H 57.40351 9.73123624
whose complement 32.59649 is the side L H or altitude sought.

The second varietie is when the Sun is in the Northerne signes *Aries*, *Taurus*, *Gemini*, *Cancer*, *Leo*, *Virgo*. For the solving of the Probleme in this varietie, let A E C represent the Æquinoctiall. F the pole thereof, L E R the Horizon, G the pole thereof. B D a parallel of the *Suns* declination. F O the Meridian of the *Sun*. B H the distance of the *Sun* from the Meridian. H O the *Suns declination* North, R F the poles elevation, F G the complement.

Admit the Sun at H be distant from the Meridian B 45 degrees, and in ten degrees of *Gemini*, where his declination O H is 23.02920. which



being taken out of the Quadrant F O 90. there remains F H. 67.97090. which known in the Triangle F G H, we have given these three parts. First, the side F G 38.46667. Secondly, the side F H. 67.97090. and the included angle F G H. 45 degrees to find G H.



As the Radius
To the Tangent of F G 38.46667 9.9000864
So the Cosine of F G H 45. 9.8494850
To the Tangent of F K 29.32669 9.7495714

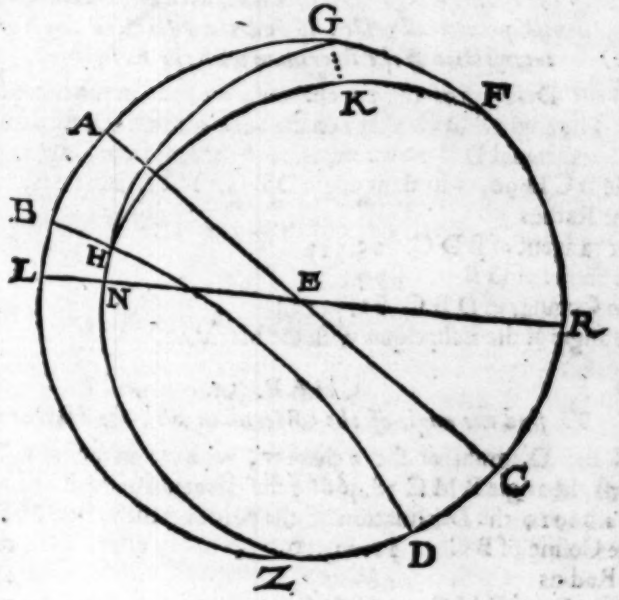
Then from F H 67.97090
Deduct F K 29.32669
There rests H K 38.64421

2. As the Cosine of F K 29.32669.*co.ar.* 0.0595626
To the Cosine of F G 38.46667 9.8937451
So Cosine of K H 38.64421 9.8926710
To the Cosine of G H 44.54111 9.8459787

The complement whereof N H 45.45889. is the altitude of the Sun above the Horizon.

The

The third variety is when the Sun is in the southern signes *Libra*, *Scorpio*, *Sagittarius*, *Capricorn*, *Aquarius*, *Pisces*. And in this case supposing the Sun to be in 10 deg. of *Sagittarius*, and having South declination 22.02910, and also 45 deg. distant from the Meridian as before in the oblique angled triangle F G H of the annexed Diagram we have given 1. The side F G. 38.46667. 2. The side F H 112.02910 and the angle G F H 45 deg. Then as before, I say



As Radius		
To the tangent of G F	38.46667	9,9000864
So Cosine of G F H	45.	9,8494850
To the tangent of F K	29.32669	9,7495714
From F H	112.02910	
Deduct F K	29.32669	
Rest K H	82.70241	

E As

As the Cosine of F K	29.32669	co. ar.	0.0595626
To the Cosine of F G	38.46667		9.8937451
So the Cosine of K H	82.70241		9.1038818
To the Cosine of G H	83.43974		9.0571895

whose compl. H N. 6.56026 is the Suns altitude required. The like is to be observed of the Moon with the other planets and fixed Starres.

CHAP. 13.

Having the Suns greatest Declination, with his distance from the next Equinoctiall point, to find the Meridian angle or intersection of the Meridian with the Ecliptique.

IN the Diagram of the 10 chapter, we have in the triangle D C B. 1. The angle B D C 23.5250 the Suns greatest Declination. 2 The Hypothenusal D B 70 the distance of the Sun from *Aries*. 3 The angle B C D 90, to find the angle D B C. The Analogie is,

As the Radius		
To the tangent of B D C.	23.525	9.6388198
So the cosine of D B	70	9.5340516
To the Cotang. of D B C	81.53133	9.1728714

or the angle of the Ecliptique with the Meridian.

CHAP. 14.

To find the angle of the Meridian with the Horizon.

IN the Diagram of the 5 chapter, we have in the triangle B C M, first, the angle B M C 38.46667 the elevation of the Equator. 2 B C 22.02910 the Declination of the point given, to find M B C.

As the Cosine of B C	22.02910	co ar.	0.0329234
Is to Radius			10.000000
So is Cosine of B M C	38.46667		9.8937451
To the Sine of M B C	57.63275		9.9266685

CHAP. 15.

The Poles elevation, with the Suns Altitude and Declination given, to find his Azimuth.

IN the oblique angled sphæricall triangle G H F, in the second Diagram of the 12 Chapter, we have known H F the complement of the Suns Declination. 2 The side G F the complement of the poles elevation,

vation. 3 The ſide H G the complement of the Suns altitude, to find H G F.

1. The ſide F H	67.97090
2. The ſide G F	38.46667
3. The ſide H G	44.54111
Summe	150.97868
Halfe ſumme	75.48934

Sine of G F	38.46667	co. ar.	0.2061682
Sine of H G	44.54111	co. ar.	0.1540214
Diff. G F ½ ſum	37.02267		9.7796909
Diff. H G ½ ſum	30.94823		9.7111855
Quadrat of the Sine of ½ the angle			19.8510560
Half is the Sine of 57.39644			9.9255280

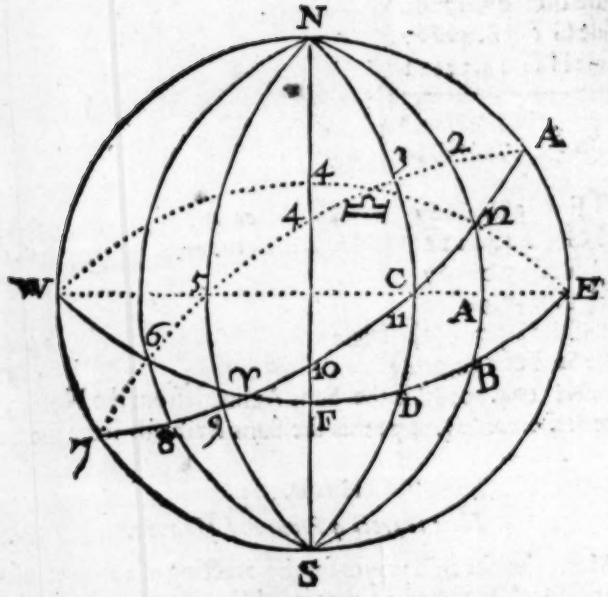
whoſe double 104.79288 is the Suns Azimuth from the North, and the complement thereof 75.20712 is the Suns Azimuth from the South.

CHAP. 16.

How to erect a Figure of Heaven.

AMong the ſeverall wayes for the erecting of a figure, uſed by the ancient Aſtronomers, that is held moſt rationall which divideth the Equinoctiall into twelve parts by circles meeting at the interſections of the Meridian and Horizon, which is according to the following Scheame, in which the line W Z E repreſents the Eaſt and Weſt Azimuth W ♈ E is that halfe of the Equinoctiall above the earth, and W ♎ E is that half of the Equator under the earth. The arch 7 ♈ 1, doth repreſent that halfe of the ecliptick above the earth.

And 7 ♎ 1 that part under the earth. The utmoſt circle N E S W repreſents the Horizon, N Z S the meridian, N the north, and S the South end thereof. The Eqninoctiall circle W ♈ E ♎ is divided in to 12 equall parts, by which diviſions paſſe arches, from the North and South interſections of the meridian with the Horizon, which cut the Ecliptique at the cuſpe of the houſes, N 1 S is the cuſpe of the Aſcendant, N 7 S of the 7 houſe N 2. 12 S of the ſecond and twelfth, N 3. 11 S of the third and eleventh, and ſo of the reſt as you ſee in the Figure.



To find the Mid-heaven or Tenth House.

When you would erect a figure you must have the true place and Right Aſcenſion of the Sun for the time propoſed, ſet the given time in the meridian of *London* where the North pole is elevated above the Horizon 51.53333 be *July* the 16. After noon 18 hours, 4564 in the yeare 1587. For which time according to our Tables the Suns place is in *Virgo* 4.07368 which known the Midheaven or 10 houſe may thus be found.

Firſt, enquire the Right Aſcenſion of the Sun at the time propoſed by the 4 Chapter thus.

As the Radius

To the tangent of A C	25.92632	9.6867627
So cosine of B A C	23.52500	9.9623154
To the tangent of B C	24.02427	9.6490781
whoſe complement	155.97573 is the Right Aſcenſion ſought.	

To

To the Right Aſcenſion of the Sun		255.97573
Adde the Right Aſcenſion of time		276.84600
Right Aſcenſion of the Mid-heaven		432.82173
Deduct a whole circle		360.
Then reſts for the Right Aſcenſion		072.82173

Then in the Rectangle Spherical Triangle ♈ 10 F we have given. 1 ♈ F the Right Aſcenſion of the mid-heaven. 72.82173 2 The Suns greateſt Declination F ♈ 10. 23.5250 to find ♈ 10 the point culminating.

As the Radius.

To the Cotangent of F ♈	72.82173	9.4901498
So coſine of 10 ♈ F	23.5250	9.9623154
To the cotangent of ♈ FO	74.17501	9.4524652

To find the Cuſpe of the 11 *houſe.*

Unto the Right Aſcenſion of the 10 houſe	72.82173
Adde 30 degrees	30.00000
And then the oblique Aſcenſion of the 11 houſe	102.82173
To this adde	30.
Oblique Aſcenſion of the 12 houſe	132.82173
	30.
Oblique Aſcenſion of the Aſcendant	162.82173
	30.
Oblique Aſcenſion of the 2 houſe	192.82173
	30.
Oblique Aſcenſion of the 3 houſe	222.82173

The Oblique Aſcenſion of the houſes thus found by a continuall addition of 30 degrees, we muſt next find the poles elevation upon their ſeverall circles of poſition thus, In the rectangle ſpherical Triangles E A B and E C D we have limited. 1. Their common angle at E the latitude of the place. 2. E B and E D 38 and 60 with the right angles A and C to find the angles B and D, being the angles that the circles of poſition make with the Equator.

Firſt, then for the 11 *and* 3 *houſes.*

As the Radius		
To the Coſine of E D	60.	9.6947000
So tangent of C E D	51.53333	10.0999136
To cotangent of C D E	57.81626	9.7988836

whoſe complement 32.18374 is the height of the pole above thoſe circles of poſition.

For the 12 and 2 houſes.

As the Radius
To the Coſine of E B 30 9.375306
So tangent of A E B 51.53333 10.0999236
To cotangent of A B E 42.53308 10.0374442
whoſe complement 47.46692 is the height of the pole required.

Having thus found the ſeverall oblique Aſcenſions of the ſeverall houſes together with the elevation of the pole, above their ſeverall circles of poſition, in the oblique angled ſpherical Triangle ♈ C D we have limited 1. The angle ♈ D C complement to C D E. 2. The angle C ♈ D the Suns greateſt Declination. 3. Their included ſide ♈ D the oblique Aſcenſion of each houſe to find ♈ C the point of the Ecliptique. The Analogies are.

For the 1 Operation.

As the Sine of the halfe ſumme of the angles.
To the Sine of halfe their difference.
So the tangent of halfe the ſide comprehended.
To the tangent of halfe the difference of the ſides

For the 2 Operation.

As the Coſine of the half ſumme of the angles
To the Coſine of their halfe difference.
So the Tangent of halfe the ſide comprehended.
To the Tangent of half the Summe of the ſides.

The Summe of theſe two arches, ſhall give you the point of the Ecliptique deſired.

For the Cuſpe of the 11 houſe.

The oblique Aſcenſion or arch ♈ D is 102.82173
The halfe thereof is 51.41086
The complement of C D E 57.81626 is the angle
♈ D C. 122.18374.
C ♈ D. 23.52500. Or the Suns greateſt Declination

Summe	145.70874	Half Summe	72.85437	
Differ.	98.65874	½ Differ.	49.32937	
Sine ½ Summe	72.85437		co. ar.	0.0197429
Sine ½ Differ.	49.32937			9.8799374
Tang. ½ ♈ D	51.41086			10.0980083
Tang ½ Differ.	44.84740			9.9976886

For

For the 2 Operation.

Cosine ½ Summe	72.85437	co. ar.	0,5304705
Cosine ½ Differ.	49.72937		9.8140541
Tangent ½ ♈ D	51.41086		10.0980083
Tangent ½ Summe	70.15211		10.4415329
1 Arch *adde*	44.84740		
Summe	114.99951		

or ♋ 24.99951 is the point of the Ecliptique for the 11 house. *For the 12 house.*

The Oblique Ascension or arch ♈ D is 132.82173
The halfe thereof is 66.41086
The complement of C D E 42.53308 is the angle
♈ D C 137.46692
C ♈ D 23.52500

Summe	160.99192	½ Summe	80.49596
Differ.	113.94192	½ Differ.	56.97096
Sine ½ Summe	80.49596	co. ar.	0.0060025
Sine ½ Differ.	56.97096		9.9234483
Tang. ½ ♈ D	66.41086		10.3598529
Tang. ½ Differ.	62.81111		10.2893037

For the 2 Operation.

Cosine ½ Summe	80.49596	co. ar.	0.7822080
Cosine ½ Differ.	56.97096		9.7364475
Tangent ½ ♈ D	66.41086		10.3598529
Tangent ½ Summe	82.46470		10.8785084
1 arch *adde*	62.81111		
Summe	145.27581		

or ♌ 25.27581 is the point of the Ecliptique for the 12 house.

For the Cusp of the Ascendant.

The Oblique Ascension or ♈ D is 162.82173
The halfe thereof is 81.41086

The angle C D E is the same with the height of the Equator 38.46667 whose complement to a semicircle is the angle.

♈ D C 141.53333
C ♈ D 23.52500

Summe	165.05833	½ Summe	82.51916
Differ.	118.00833	½ Differ.	59.00416

Sine

Sine ½ Sum—	82.52916	co. ar.	0.0037026
Sine ½ Differ.	59.00416		9.9330844
Tangent ½ ♈D	81.41086		10.8209024
Tangent ½ Dif.	80.09004		10.7576894

For the 2 Operation.

Cosine ½ Summe	82.52916	co. ar.	0.8859846
Cosine ½ Differ.	59.00416		9.7117867
Tang. ½ ♈ D	81.41086		10.8209024
Tang. ½ Summe	87.81606		11.4186737
1 Arch add	80.09004		

Summe 167.90610. Or ♍ 17.90610 is the point of the Ecliptique for the Ascendant

For the Cusp of the 2 house.

The Oblique Ascension is 192.82173 whose complement is the Arch ♈D 167.17827.

The half whereof is 83.58913. The summe and Difference of the angles are the same with those for the 12 house.

Therefore I say first,

Sine ½ Summe	80.49596	co. ar.	0.0060025
Sine ½ Differ.	56.97096		9.9234483
Tangent ½ ♈D	83.58913		10.9493879
Tangent ½ Diff.	82.47036		10.8788387

For the 2 Operation.

Cosine ½ Summe	80.49596	co. ar.	0.7822080
Cosine ½ Differ.	56.97096		0.7364475
Tangent ½ ♈D	83.58913		10.9493879
Tangent ½ Summe	88.05055		11.4680434
1 Arch adde	82.47036		

Summe 170.52091 whose complement 189.47909 or ♎ 9.47909, is the Cusp of the 2 house.

For the Cusp of the 3 house.

The Oblique Ascension is 222.82173, whose complement is the arch ♈D 137.17827. The half whereof is 68.58913. The summe and difference of the angles are the same with these for the 11 house.

Therefore I say first,

Sine

Sine ½ Summe	72.85437	co. ar.	0.0897419
Sine ½ Differ.	49.32937		9.8799374
Tangent ½ V D	68.58913		10.4065869
Tangent ½ Diff.	63.71032		10.3062672

For the 2 Operation.

Cosine ½ Summe	72.85437.	co. ar.	0.5304705
Cosine ½ Differ.	49.32937		9.8140541
Tangent ½ V D	68.58913		10.4065869
Tangent ½ Sum	79.94186		10.7511115
1 Arch adde	63.71032		
Summe	143.65218 whose complem.	216.34782 or m	6.34782

is the point of the Ecliptique for the Cuspe of the third house.

The six Orientall houses being thus found, the other 6 are also found, by consequence, being the same degrees and parts of the opposite signes.

And thus we have not onely erected a figure for the time given, but composed a Table, for the generall erecting a figure in this latitude, for by adding together the first and second numbers, in every of those proportions, there is composed 2 numbers for every house, to each of which the Artificiall tangent of halfe the oblique Ascension being added, their aggregates are the tangents of two arches, which added together is the distance of the Cuspe of the house from the first point of *Aries*. Onely note that if the oblique Ascension be more then 180 deg. you must take the tangent of halfe the complement to a whole circle; And to find the Cuspe of the house, you must also take the complement of the added arches, as shall be cleared by example.

A New Table of Houses for the Latitude of London.

	11 & 3 hous.	Ascendent	12 & 2 hous.
1 Oper.	9.8996803	9.9367870	9.9294508
2 Oper.	10.3445246	10.5977713	10.5186555

Having found the oblique Ascensions of the houses as before was shewed, take out the tangent of half thereof from a Table of Tangents, whose Radius is 10.0000000, and set them down twice on your paper as you see in the following example, then seek in the top of the Table, the house whose cuspe you would find; and under the same you have two numbers, the first of which being added to one of the tangents in the paper, and

the second to the other, will give you the tangents of two arches, whose aggregate is the Cuspe desired.

Example.

The Oblique Ascension of the 11 house was before found to be 102.82173. And the tangent of the halfe thereof 51.41086 is 10.0980083 the first number in the Table under the 11 house is 9.8996803 their same rejecting Radius 9.9976886, is the tangent of 44.84740. The second number in the Table.

Tangent 51.41086	10.0980083
1 Number	9.8996803
Tangent 44.84740	9.9976886

is 10.3445246, which being added to the same tangent, there summe 10.4425329 is the tangent of 70.15211 and the aggregate of these two arches.

Tangent 51.41086	10.0980083
2 Number	10.3445246
Tangent 70.15211	10.4425329
1 Arch 44.84740	
Summe 114.99951	

gives the point of the Ecliptique in *Cancer* 24.999.

2 Example.

The Oblique Ascension of the 2 house was before found to be 292.82173 The tangent of halfe the complement 83.58913 is 10.9493879

Tangent 83.58913	10.9493879
1 Number	9.9294508
Tangent 82.47036	10.8788387
Tangent 83.58913	10.9493879
2 Number	10.5186555
Tangent 88.05055	11.4680434

1 Arch. 82.47036 Summe 170.52091 whose complement 289.47909 is the Cuspe desired.

The Cuspe of your houses being thus found, draw your figure after this manner, and then place the Signes and Degrees on the Cuspes of their proper houses, beginning with the 10 house.

10 house

10 house	♊	14.	17.	The opposite houses are in the opposite signes.	4 house	♐	14.	17.
11 house	♋	24.	99.		5 house	♑	24.	99.
12 house	♌	25.	27.		6 house	♒	25.	27.
Ascendent	♍	17.	90.		7 house	♓	17	90.
2 house	♎	09.	47.		8 house	♈	9.	47.
3 house	♏	06.	34.		9 house	♉	6.	34.

The 12 signes being placed in the figure we must next enquire for the true places of the Planets, with the Dragons head, the which according to the doctrine of the second Book at the time proposed are as followeth.

Suns place ♍ 4. 07. ☽ ♏ 1. 40. ☿ ♌ 5. 19. ♀ ♍ 16. 58.
Moons place ♊ 26. 24. ♄ ♌ 5. 19. ♂ ♑ 8. 87. ♃ ♎ 29. 81.

The places of the Planets being thus found, consider under what signe any of them falleth, which being observed, note which of the houses contain the signe in which the planet is, observing the number of Degrees, and in due order place the planet in that house.

Right Ascension of the Mid-heaven, 72. 82.

And when a Planet contains a leſſer number of Degrees then the Cuſpe of the houſe, he is to be placed before the houſe, in the houſe preceding, but if greater, he is be placed beyond the Cuſpe, according to the ſequel, and conſequence of the ſignes.

As in the figure, *Sol* is in 9 degrees and 7 parts of *Virgo*, and the ſigne is placed upon the Cuſpe of the Aſcendent, but becauſe the Cuſpe thereof containeth more degrees of that ſigne then the Sun, I place the Sun in the preceding houſe, that is in the twelfth.

CHAP. 17.

To find the Angle of the Ecliptick with the Horizon, or the Altitude of the Nonageſime *deg. together with its diſtance from the Mid-heaven.*

BY the rules delivered in the laſt Chapter, find the point culminating, whoſe declination being ended to the altitude of the Equator in the Northerne ſignes, or ſubtracted in the Southern, gives you the altitude of the Mid-heaven, ſuppoſe 10 degrees of *Gemini* were in

in the Mid-heaven, the declination thereof by the [illegible] which being added to the altitude of the Equator 38.46667, because the declination is North, their sum 60.49577 is the Altitude of the Mid-heaven, and the meridian angle of the same point by the 13 Chapter is 81.53133, hence in the triangle 7.10.S of the Diagram in the last Chapter, we have given 10.S. 60.49577 the altitude of Mid-heaven. The angle 7.10.S 81.53133. the Meridian angle to find the angle 10.7.S.

As the Radius		
To the sine of 7.10.S.	81.53133	9.9952385
So Cosine of 10.S	60.49577	9,6923956
To Cosine of 10.7.S	60.84861	9.6876341

And to find 7.10 or the distance of Mid-heaven from the Nonagesime degree, the Analogie is

As Radius		
To the Cosine of 7.10.S	81.53133	9.6677126
So is the cotangent of 10.S	60.49577	9.7527167
To the tangent of 7.10	14.75047	9.4204293
Mid-heaven *add*	70.00000	
Summe	84.75047	

is the Nonagesime degree. And note that arch found is to be added to the Mid-heaven from *Capricorn* to *Cancer*, to be subtracted from *Cancer* to *Capricorn*.

CHAP. 18.

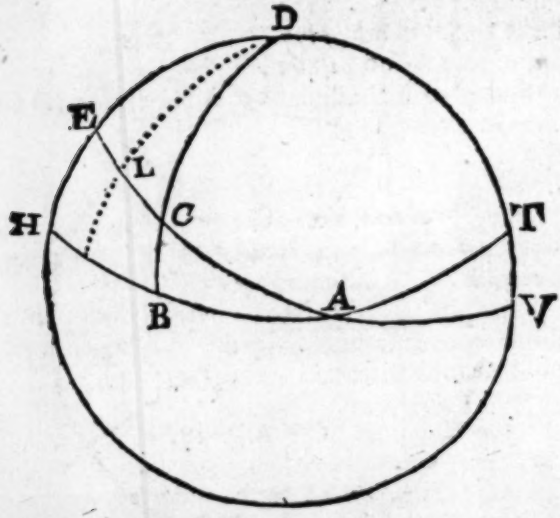
To find the Parallactical angle, or angle of the Ecliptique with the Verticall circle.

THe angle of the Ecliptique with the verticall circle, is an angle made by the oblique cutting of the circle of altitude, with the Ecliptique, which is a right angle, when the said circle passeth through the 90 degree of the Ecliptique, but falling without the same it is oblique; as in the following figure, D denotes the Zenith, D C B the verticall circle, D E H V T the Meridian, T A B H the Horizon, V A E the Ecliptique, C the angle of the intersection of the Ecliptique with the Vertical.

In

In the 16 Chapter is shewed how to find the point of the Ecliptique Ascending, and the Suns altitude at any time in the 12 Chapter, which being obtained we may speedily find the parallactical angle.

Admit the Sun at C be in ♎ 4.07368 distant from the Meridian hours 5.5436 or 83.1540. *Ad artum.* His Declination will be found by the 2 Chapter to be 10.05037, and his altitude by the 12 Chapter 12.10189. The point Ascending by the 16 Chapter is ♎ 17.90619.



which known, in the triangle A B C we have. 1. A C 13.90610. Secondly, B C 12.10189, to find the angle A C B. I say then,

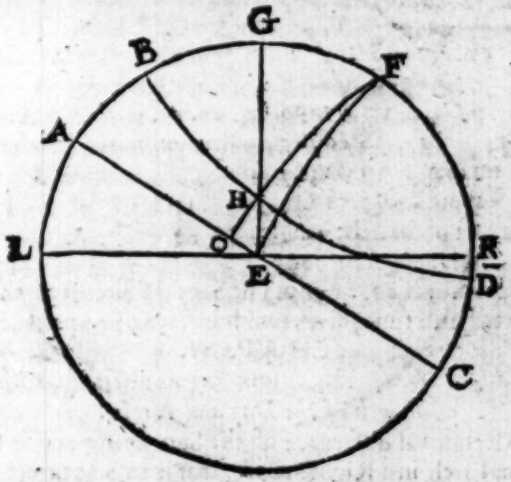
As the tangent of A C	13,9061	*co. ar.*	0.6062707
Is to Radius			10.0000000
So tangent B C	12.10189		9.3312569
To Cosine of A C B	30.00067		9.9375276

CHAP.

CHAP. 19.

The elevation of the Pole and Declination of the Sun given, to find the time when he will be due East and West.

IN the second variety of the 22 Chapter, the complement of the Suns Declination F H is 67.97090 and the complement of the poles elevation F G 38.46667, hence the angle G F H equal to the Arch of the Æquator A O is to be sought, therefore I say,



As Radius		
To Cotangent F H	67.97090	9.607062
So tangent F G	38.46667	9.900086
To Cosine of G F H	71.24779	9.507148

whose complr. O F E 18.75221 being converted into time giveth 1 hour 25147 parts of an hour, and so long it is after 6 in the morning when the Sun will be due East, and before 6 at night when he will be due West.

CHAP.

CHAP. 20

The Elevation of the Pole, with the Suns Declination and Altitude given, to find his distance from the Meridian.

IN the Oblique angled Spherical triangle G H F in the 2 Diagram of the 12 Chapter, we have known H F the complement of the Suns Declination, G F the complement of the poles elevation, H G the complement of the Suns altitude, to find G F H the angle of the Suns distance from the Meridian.

1 The side H G 44.54111
2 The side F H 67.97090
3 The side G F 38.46667

Summe	150.97868		
Half Summe	75.48934		
Sine of F H	67.97090	co. ar.	0.0329234
Sine of G F	38.46667	co. ar.	0.2061682
Differ. G F ½ Summe	37.02267		9.7796909
Differ. F H ½ Summe	07.51844		9.1167578
Quadrat of the sine of half the Angle			19.1355403
Which bisected, is sine of	21.69295		9.5677701

And the double therof is 43. 38590. The Suns distance from the Meridian, And converted into time, gives two houres, 89259 parts.

CHAP. 21.

To find the time of the Suns rising and setting, with the length of the Day and Night.

THE Ascensional difference of the Sun being added to the Semidiurnal arch in a Right Sphere, that is to 90 degrees in the Northern signes, or substracted from it in the Southern, there summe or difference will be the Semidiurnal arch, which doubled is the day Arch, and the Complement to 360 is the night Arch, which bisected is the time of the Suns rising, and the day Arch bisected is the time of his setting.

As when the Sun is in ten degrees of *Gemini*, his Ascensional difference is found to be 30.61613
The Quadrant Add 90.
The Semidiurnal Arch 120.61613
The diurnal arch 241.23226
Whose Complement 118.76774

Con-

Converted into time gives 7 houres 91678 parts, which biſected gives the time of the Suns riſing. 3 hours 95539, parts; or a little before 4 of the clock.

CHAP. 22.

To find the diſtance of a ſtar from the Meridian.

IF a Starre be between the Mid-heaven and the Horoſcope deduct the Right Aſcenſion of the Mid-heaven from the Right Aſcenſion of the Starre, what remaineth is the diſtance from the Meridian. If a ſtarre be between the Mid-heaven and the 7 houſe, deduct the Right Aſcenſion of the ſtarre from the Right Aſcenſion of the Mid-heaven, and what remaineth is the diſtance as before.

If a ſtarre be between the 7 houſe and the *Imum Cœli* or fourth houſe, deduct the Right Aſcenſion of the *Imum Cœli* from the Right Aſcenſion of the ſtarre, and what remaineth is the diſtance from the Meridan. If a ſtar be between the Aſcendant and the *Imum Cœli* deduct the Right Aſcenſion of the ſtar from the Right Aſcenſion of the *Imum Cœli*, and what remaineth is the diſtance from the Meridian as before.

For Example. In the preceding figure, the Right Aſcenſion of the Mid-heaven is 072 deg. 82 parts. The Sun is in the 12 houſe and his Right Aſcenſion 155.97

From which deduct the Right Aſcenſion of the *M. C.* 72.82

The diſtance of the Sun from the Meridian is 83.15

CHAP. 23.

To find the Elevation of the Pole above any circle of poſition.

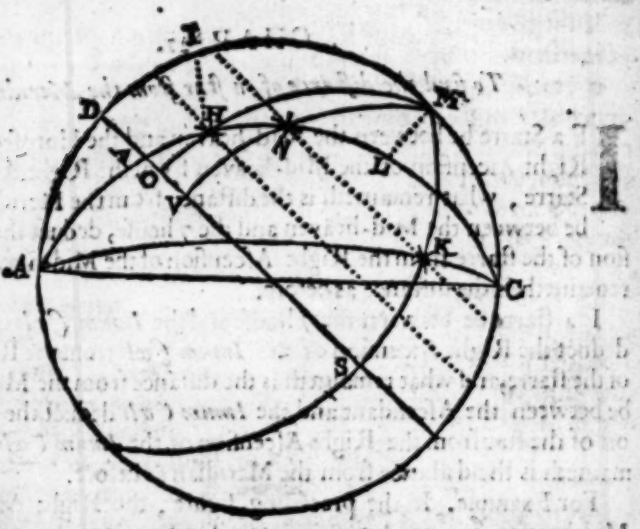
A Circle of poſition, is as it were a certaine Horizon (upon which the point or ſtar propoſed doth ariſe) paſſing by the two interſections of the Horizon with the Meridian, and may be either above or under the Earth, in reſpect of the place for which the figure is erected.

A ſtar poſited in the

1, 2, 3, 4, 5, 6, 7 houſe is { Under the earth
7, 8, 9, 10, 11, 12, 1 houſe is { Above the earth

Thus in the annexed Diagram A H C is a circle of poſition paſſing by the Horizontal point of the *Significator* at H, and the two interſections of the Ho-

Horizon of the place at A and C, and L M is the elevation of the pole above this Horizon of the ſtar or circle of poſition.



To find which there muſt be known. 1. The latitude of the place. 2. The Declination of the ſtar or point propoſed. 3. The diſtance thereof from the Meridian. Hence to find the angle of Inclination of the circle of poſition with the meridian, the proportions are as followeth.

1. As the Radius, To the tangent of the complement of the ſtars declination: ſo is the Coſine of the ſtars diſtance from the meridian, To the tangent of the firſt arch. To which the pole of the place being added, or ſubtracted from it according to the following direction, their ſumme or difference is the ſecond arch.

If the diſtance of the ſtar from the meridian, be more then 90 and the declination South under the earth or north above it, ſubtract the firſt arch from the poles elevation, and what remaineth is the ſecond arch.

If the diſtance of a ſtar from the meridian be leſſe then 90, and the declination ſouth under the earth, or north above it, adde the poles elevation, to the firſt arch, and their aggregate if leſſe then 90 is the ſecond arch, if more then 90 the complement thereof.

If the diſtance of a ſtar from the meridian, be either more or leſſe

then

ther ye, and the Declination North under the earth, or South above it. Substract the elevation of the Pole from the first arch, and what remaineth is the second arch.

If the distance of a star from the Meridian be a just quadrant, the angle of inclination may be found at one operation, as in the fourth example.

2 As the sine of the first arch found: Is to the cotangent of the Stars distance from the Meridian: So is the sine of the second arch found; To the cotangent of the angle of inclination. Then to find the elevation of the Pole above the circle of position, the analogie is.

3 As the Radius, To the sine of the Pole of the place: So is the sine of the angle of inclination; to the sine of the Pole of the Circle.

1 Example.

Let the distance of a Star from the Meridian, be more then 90, viz. 97 deg. And the Declination of the Star 31 deg. North above the earth: the Pole of the place 45. Then in the oblique Spherical Triangle H M C we have limited. 1 The side M C the Poles elevation 45 degrees. 2 The side H M the complement of the Stars declination 59 degrees. 3 The angle H M C, the Stars distance from the Meridian 97, or instead thereof the acue angle I M H 83, the complement of the other to a Semicircle.

Hence to find I M the proposition is.

As the Radius 90	10.0000000
To the tangent of H M 59	10.2212262
So is the Cosine of I M H 83	9.0858946
To the tangent of I M 11.47	9.3071208

which being substracted from 45 the Poles elevation, there resteth 33.53 the second arch.

2 As the sine of I M 11.47	9.2985361
To the Cosangent of I M H 83	9.0891437
So is the sine of I C 33.53	9.7412328
To the Cosangent of H C M 71.17	9.5318404

The angle of inclination.

3 As the Radius 90	10.0000000
To the sine of C M 45	9.8494850
So is the sine of H C M. 71.17	9.9701174
To the sine of L M. 42.01	9.8195960

The height of the Pole above the Circle of position.

2 Example.

Let the distance of a Star from the meridian be less then a quadrant,

viz. 44.7. The Declination of the Star, 14.52. North above the Earth, the Pole of the place 45. then as before.

1 I say, As the Radius 90		10.0000000
To the tangent of H M. 75.15.		10.5765162
So the Cosine of I M H 44.7.		9.8574210
To the tangent of I M. 69.74.		10.4329372

To which add the Pole, 45.00. There aggregate is 114.74. whose Complement 65,26. is the second Arch.

2 As the sine of I M. 69.74.		9.9722634
To the cotangent of I M H. 44.7.		10.0141010
So the sine of I C 65 .26.		9.9581892
To the Cotangent of H C M 45		10.0000267

The angle of Inclination.

3 As the Radius	90	10.0000000
To the sine of C M	45	9.8494850
So is the sine of H C M	45	19.8494850
To the sine of L M	30	9.6989700

The height of the Pole above that Circle of position.

3 *Example.*

Let the distance of a Star from the Meridian be 22.82. the declination 23,53. South above the Earth: And the Pole 49.

1 Then as the Radius	90	10.0000000
To the tangent of H M	76.47	10.6186455
So is the Cosine of I M H	22.82	9.9646026
To the tangent of I M.	75.37	10.5832481
Subtract the Pole	49.00. There rests 26.37. for the 2d arch	
2 As the sine of I M	75.37	9.9856855
To the Cotangent of I M H	22.82	10.3759530
So is the sine of I C	26.37	9.6475454
To the Cotangent of H C M	42.51	10.0378129

The angle of Inclination.

3 As the Radius	90.	10.0000000
To the sine of C M	49.	9.8777798
So is the sine of H C M	42.51	9.8297661
To the sine of L M	30.66	9.7075452

The height of the Pole above that Circle of position.

4 *Example.*

If the distance from the Meridian be a just Quadrant, or 90 degrees, then

then omitting the two first proportions, the angle of Inclination may be found at one operation, by this analogie. As

As the tangent of the Complement of declination, is to Radius.
So is the sine of the Pole, to the cotangent of the angle of inclination.
Let then the declination be 23, and the Pole 45. I say,

As the tangent of H M	67	10.3721483
Is to Radius or the angle H M C	90	10.0000000
So is the sine of M C	45.	9.8494850
To the Cotangent of H C M	73.30	9.4773369
Then as Radius, to the sine of M C	45.	9.8494850
So is the sine of H C M	73.30	9.9812850
To the sine of L M	42.63	9.8307700

The height of the Pole above that Circle of position.

CHAP. 24.

Of the Ark of Direction, what it is, and how to finde it.

Astrologers use to fore-tel the general Fortune of any Native by the consideration of the 12 Houses, but the particular time, in which we may expect, what is promised by the position of the Heavens at the time of the Birth, they measure out by the arke of Direction. That is, by the distance of the *Significators* from there *Promittors* reckoned in the *Æquator*, by *Significators* usually meaning, the *Ascendent*, *Mid-heaven*, *Sun*, *Moon*, and part of *Fortune*: And by *Promittors*, the several *Aspects* of these *Significators* to the Planets, or the twelve Houses.

For the clearer understanding of what the arke of Direction is, in the Diagram of the last Chapter, Let A D C represent the Meridian D V S E the *Æquator*, A C the Horizon, M the North-pole, A H C a Circle of position above the Earth, H B and N R two parallels of Declination. H the *Significator*, D O his right Ascension. H O his Declination. R the *Promittor* D S his right Ascension, R S his declination. Now when the *Promittor* at R comes to N, it is in the same Circle of position with the *Significator* at H, and the Circle of Declination M R S will be changed into the Circle of Declination M N V, and then the arch of the *Æquator*, D V is the Right Ascension of the *Promittor* at N, and therefore the arch of the *Æquator* V S is the arke of Direction sought. And the manner of finding thereof is as various, as the position of the *Significator* may be in the figure, which is threefold, *viz.* Either in the Meridian, in the Signes Ascending, or in the Signes Descending.

CHAP.

CHAP. 25.

How to direct the Mid-heaven, and the Imum Cœli.

A Star posited in the meridian, that is, either in the mid-heaven or *Imum Cœli*, must be directed to his *Promittors*, by the right Ascensions of the *Significator* and *Promittor*. If a *Significator* posited in the mid-heaven be to be directed. Substract the Right Ascension of the mid-heaven, from the Right Ascension of the Star or *Promittor*, taken with its latitude if it have any, and what remaineth is the ark of Direction.

For Example. Let the mid-heaven of the preceding figure in the 16 Chapter, be directed to the 12 degree of *Capricorn*.

The Right Ascension of the 12 degree of *Capricorn* is	283.03
From which substract the Right Ascension of the mid-heaven	072.02
There rests for the Ark of Direction	211.23

In like manner: If the *Imum Cœli* or fourth House, or a Star posited upon the Cuspe thereof be to be directed, you must substract the Right Ascension of the *Imum Cœli*, or fourth House, from the Right Ascension of the *Promittor*, and what remaineth is the ark of Direction.

CHAP. 26.

How to direct the Ascendent, or Significator posited in the Signes Ascending.

THe Horoscope or Ascendent, or a *Significator* posited in the signes ascending, that is, in the 12, 11, 10, 1, 2, or 3 houses, must be directed to *Promittors*, by the oblique Ascensions answering to the elevation of the Pole above the Circle of position of the *Significator*. The elevation of the Pole above the ascendent is the same with that of the place for which the figure is erected. The Poles elevation above the Circle of position of any other *Significator* must be found as hath been shewed in 22 Chapter. Then if you deduct the oblique Ascension of your *Significator*, from the oblique Ascension of your *Promittor*, what remaineth is the arke of direction.

For example. Let the Ascendent of the preceding figure in the 16 Chapter be to be directed to the 26 deg. of *Taurus*. The elevation of the Pole of the Circle is the same with that of the place, *viz.* 51 ½.

And therefore the oblique Ascension of 26 deg. of *Taurus*,	27.56
To which add a Circle that substraction may be made	360
And then the Oblique Ascension is	387.56
The Oblique Ascension of the Ascendent substract	162.82
There rests for the ark of Direction	224.68

Another Example.

Let us suppose a *Significator* to be posited in the signes Ascending but not upon the Cuspe of the Ascendent, in this case though the Arke of Direction must be found out by the Oblique Ascensions as before; yet the elevation of the Pole above the Circle of position must be first found, because it is not given, as in the last Example.

In the Diagram of the 23 Chapter, let the distance of the *Significator* from the meridian be 44.07. The declination thereof North above the Earth H O 14.85. Hence the Pole I M is 30 degrees. Let this *Significator* be posited in 10 degrees of *Taurus*, the Right Ascension thereof D O 37,58. His Ascensional difference under the elevation of 30 degrees F O 8.80. Let the *Promittor* be in 25 of *Gemini*, the Right Ascension thereof D S. 84.55. And the Ascensional difference when this *Promittor* comes to N. is represented by the letters F V. 14.47. Now then if you substract the Ascensional Difference of the *Significator* F O, 8.80. from the Ascensional Difference of the *Promittor* F V. 14.47. There will remaine O V 5.67. we call it the Æquation of the Arke of Direction, which being added to the Right Ascension of the *Significator* D O 37.58. Their aggregate is the arch D V 43.25. Then if you deduct the arch D V 43.25 from the Right Ascension of the *Promittor*, D S. 84.55. There difference is V S 41.30. The Ark of Direction sought.

Or thus the Oblique Ascension of the *Promittor* is 70.08. The Oblique Ascension of the *Significator* is 28.78. There difference 41.30, is the Arke of direction sought, as before.

CHAP. 27.

How to direct a Significator posited in the Signes Descending.

THe Descendent or seventh House or *Significator* there posited, or in any signe descending, that is, in the 4, 5, 6, 7, 8, or 9 Houses, must be directed to his *Promittors*, by the oblique Descensions answering to the Elevation of the Pole of the Circle of position of the *Significator*. As suppose the mid-heaven be in 22.33 of *Gemini*. And the Right Ascension thereof 81.65. Let the *Significator* be in 10 degrees of *Taurus*. The declination thereof 14.85. North. His distance from the meridian 44.07. Hence the Elevation of the Pole above that Circle of position is 30, as before.

Let the *Promittor* be in 25 degrees of *Gemini*, the declination 23.40 North. Now the declination of the *Significator* and *Promittor* being the same with the former, and the Pole of the Circle the same, the Ascen-

sion,

sional Differences as well of the *Significator* as of the *Promittor*, must needs be the same with the former Example, and consequently the same Æquation of the ark of Direction: if then you would find this ark of Direction, by the Right Ascensions, Adde this Æquation of the ark of Direction, to the Right Ascension of the opposite point of the *Promittor*: and from their aggregate, subtract the Right Ascension of the opposite point of the *Significator*, and what remaineth is the ark of Direction.

As the oppoite point to this *Promittor* in the 25 of *Gemini*, is the 25 of *Sagittarius*, the Right Ascension whereof is	264.55
The former Æquation of the ark of Direction	5.67
Their Aggregate	270.22
The opposite point to the *Significator* in the 10 of *Taurus* is the 10 of *Scorpio*, whose Right Ascension is	217.56
Which subtracted from the former aggregate leaveth	52.64

For the ark of Direction sought.

Or if you will by the oblique Ascensions of these opposite points thus:

The oblique Ascension of the 25 of *Sagittarius* is	279.01
The oblique Ascension of the 10 of *Scorpio*, is	226.38
There Difference is	52.63

The ark of Direction as before.

Or lastly, by the oblique Descensions, according to the intention of this Chapter, if you subtract the oblique Descension of the *Significator*, from the oblique Descension of the *Promittor*, what remaineth will be the ark of Direction.

As in this Example the oblique Descension of the *Promittor*, under the elevation of 30 degrees is	99.01
The oblique Descension of the *Significator*,	46.38
Which being subtracted from the oblique Descension of the *Promittor*, there resteth	52.63

The ark of Direction sought as before.

CHAP. 28.

How to find the Arch of the Æquator, whereby is made the general Table of Positions.

FOr finding this arch of the *Æquator*, there must be given the angle of Inclination of the Circle of position with the Meridian, & the height of the Pole above that Circle, both which may be found by the 9 Chapter:

ter: but as to our present purpose, we are not tied unto such a tedious calculation, because the Pole of the Circle may be supposed, and then the angle of Inclination may be found at one Operation, and this arch of the *Æquator* at another.

And first, the Elevation of the Pole above any Circle of position being given, together with the latitude of the place or Countrey, the angle of Inclination may be found, by this analogy.

As the sine of the Pole of the place, is in proportion to Radius: So is the sine of the Pole of the Ciicle, to the sine of the angle of Inclination.

For *Example*, In the Rectangle Spherical Triangle of the 9th Chapter L M C right angled at L. Let M C the Elevation of the Pole of the place be 45, And the Pole of the circle LM 42, hence to find the angle LCM. I say,

As the sine of M C	45.	9.8494850
Is to the Radius	90.	10.0000000
So is the sine of L M	42.	9.8255108
To the sine of L C M	71.13	9.9760258

Then to find the arch of the *Æquator*, the proportion is: As the Radius to the sine of the Complement of the Pole of the place: So is the tangent of the angle of Inclination, to the tangent of the arch of the *Æquator*. For *Example*, In the triangle A D F of the afore-said Diagram, Let there be given the side A D the Comple. of the Pole of the place 45. The angle of Inclinat. DAF 71.9. Hence to find the arch of the *Æquator*. DF, I say,

As the Radius 90		10.0000000
To the sine of AD	45	9.8494850
So is the tangent of D A F	71.13	10.4662285
To the tangent of D F	64.20	10.3157275

Which is the arch of the *Æquator* sought.

CHAP. 29.

How by the general Table of Positions, to make a particular Table for any Latitude there exprest.

IF thou wouldst make a particular table of positions, first, divide your paper or book into as many Columnes as the largness of the page will bear, then in the head of your table write the particular latitude, for which you would have the table, and under this title write in the third Column of your page. 1. In the fourth, 2, and so forward till you have fild the Columnes of your first page, do so likewise in the 2d. page, and so forward till you have written twice over the several Elevations of the Pole above the circle of position from one unto that degree for which your table

is intended; then in the first Columne of your left hand page write, North Declination under the earth and South above it, in the second columne thereof write orderly the several degrees of declination, beginning with a cypher or nought, and then 1, 2, 3, and so forwards till you have written 32, and in the two first columnes of your right hand page write the contrary, that is, in the first thereof write South Declination under the earth and north above it; and in the second the severall degrees of Declination beginning with 32, and so downward 31.30.29. until you come to nought: having thus prepared your book according to that Table in this book, enter your general table of positions with one degree of Elevation, and in a straight line directly under the latitude of your place, you shall find the arch of the *Æquator* answering thereunto, then look for the Ascensional differences answering to every degree of Declination, under one degree of the Poles Elevation, the which being substracted from the arch of the *Æquator*, write the remainder in a direct line under one degree of Elevation, in that page which must serve for North Declination under the Earth: but for the South Declination under the Earth adde the Ascensional difference of every degree of Declination to the former arch of the *Æquator*, and write their aggregate under one degree of Elevation and right against that degree of Declination, whose Ascensional difference was added thereunto, and so shall you have one Column of your table finished, to make it plain we will add an *Example*.

In the latitude of 51 degrees 33 hundred parts, the arch of the *Æquator* answering to one degree of the Circle is 0 deg.79. and the Ascensional difference for one degree of Declination under one degree of Elevation is 0.1. of which being substracted from 79, there remaineth 78, which I write against one degree of Declination in that page of the Table serving for North Declination.

Again, to the same arch of the *Æquator*, I add 0.01. and their aggregate is 80, and this I write against one degree of Declination, and under one degree of Elevation in that page of the Table which serveth for South Declination under the Earth, and thus must you also add or substract the Ascensional differences of all the other degrees of Declination, according to this *Example*. And so shall you have a particular Table of positions for your particular latitude. The use of this Table is to finde the Elevation of the Pole above any Circle or position in that particular latitude, for which the Table is framed, as shall be shewed in his proper place.

CHAP.

CHAP. 30.

Of the Doctrine of the Sphere in Tables.

ALthough in the former book there is plainly shewed you, how to find the Declination, Right Ascension, Ascensional Difference, Oblique Ascension, Cuspes of the 12 Houses, and the height of Pole above any Circle of position, by *Trigonometrical* calculation: yet considering that, that way is not altogether so expedite and ready for practice, as some may desire, wee will also shew you how to finde the same by those Tables, that are hereunto annexed.

Precept 1.

The Declination of the Sun or other Planet is found by the signe in the head or foot, and the degree on the right side, if the signe be in the foot, or on the left side if it be in the head: for the common angle gives the Declination sought, if you have respect, to your Planets proper latitude, and the proper part proportional.

For *Example:* Suppose the Moon were in 19 degrees 56 parts of *Leo*, and her declination were required, having North latitude 3 degrees. Her Declination in that latitude, in 19 degrees of *Leo* will be found 18.02

In 20 degrees it is		17.70
There difference is		0.32
Now then if one degree give	0.32	1.5051499.
What shall	0.56	1.7481880.
They give 18 *ferè*		1.2533379

Which being subtracted from 18.02 because the Declination doth decrease, the Moons Declination will be found to be 17.84

Precept 2.

The Right Ascension by the Table following is had by the signe in the head and degree in the left side, and in the common angle is the Right Ascension.

Example. The Right Ascension of a Planet in *Aries* 13.251, and 2 degrees of South latitude be sought.

The Right Ascension of { 13 Degrees		12.73.
{ 12 Degrees		11.82.
Difference		91
If one Degree give	91	1.9590413
What shall	25	1.3979400
They give	22	1.3569813.

 Which

Which being added to 11.83 the R. aſcenſion of the point ſought will be 12.04.

But if the R. aſcen, of the point ſought be in Southern ſignes, you muſt add 180 to the arch found in the table, and you have your deſire, thus the R. aſcenſ. of 12 deg. 25 parts of *Libra*, with two degrees of North Latitude by adding 180 to the former arch will be 192.04.

Precept 3.

The aſcenſional difference of any part of the Zodiack is found by the degree of declination in the left ſide, and the degree of the Poles elevation in the head, the common angle gives the aſcenſional difference ſought. *Example.* Let a planets Declination be 4.43. whoſe aſcenſional difference is ſought under the elevation of 52 deg. The aſcenſional difference in that Elevation anſwering to 5 degrees of Declination is 6.43. to 4 degrees is 5.13. there difference is 1.30.

If one degree		
Give	1.30	2.1139433
What ſhall	43	1.6334684
They give	56 *fere*	1.7474117

Which being added to 5.13, the aſcenſional difference of the point ſought will be 5.69.

Precept 4.

The oblique aſcenſion of any part of the Zodiack is found by the ſigne and degree in the firſt Column in the left hand, and the Poles Elevation on the head of the Table, the common angle will give you the oblique Aſcenſion ſought.

Example. Let the Oblique Aſcenſion of *Virgo* 09.23. in the elevation of 42 degrees be ſought. In that elevation.

The Oblique Aſcenſion of *Virgo* 10 degrees is	159.87
Virgo 6 degree is	155.80
Their Difference	4.07

If 4 degrees	4.00	9.3979400
Give	4.07	0.6095944
What ſhall	3.23	0.5092025
They give	3.28	0.5167369

Which being added to 155.80. the oblique Aſcenſion ſought will be 159.08

Precept 5.

Theſe things premiſed, the Right Aſcenſion of *M.C*, and thereby the Mid-heaven it ſelf will eaſily be found for the houres from Noon (converted into Æquinoctial degrees, by the table for that purpoſe) being added to

the

the Suns Right Aſcenſion, do make the Right Aſcenſion of the Mid-heaven, which ſought in the *Area* of the Table of Right Aſcenſions gives the mid-heaven it ſelf.

Example.

Let the Sun be in 4 deg. 07 parts of *Virgo*, as in the 16 Chapter, the time from Noon, Houres 18.4564

The Suns Right Aſcenſion in 4 degrees of *Virgo* 155.89

His Right Aſcenſion in 5 deg. of *Virgo*, 156.85

Difference .0.95

If one degree give	95	0.9777236
What ſhall	07	1.8450980
They give	06	1.8228216

Which being added to 155.90. The Suns Right Aſcenſion is 155.96. The Æquinoctial degrees anſwering to 18 houres, *viz.*, 270 degrees. And the degrees anſwering to 4564 parts of an houre are 06.84, and therefore the Right Aſcenſion of time is 276.84, which being added to the Suns Right Aſcenſion, their aggregate 432.80. or rejecting 360 degrees, the remainer 72.80, is the Right Aſcenſion of the *Medium Cœli*, whereto anſwers in the Table of R. Aſcenſions 374.73. ♑, the point of the Ecliptick for the Mid-heaven it ſelf.

Precept 6.

The Oblique Aſcenſions of the other Houſes are found by a continual addition of 30 degrees to the Right Aſcenſion of the Mid-heaven, as hath been alſo ſhewed in the 16 Chapter, and thus the Oblique Aſcenſion of the 11 Houſe is 102.80. 12 Houſe is 132.80. Aſcendent is 162.80. 2 Houſe is 192.80. 3 Houſe is 222.80.

The Poles of Elevation above the Circle of Poſition of the Aſcendent is always the ſame with that of the place, for which the figure is erected, the Poles Elevation for the 11, 12, 2 and 3 Houſes you may find in the Table for that purpoſe annexed to the Table of Oblique Aſcenſions.

Example. By that Table under our Elevation of 51.53. the Poles Elevation above the Circles of poſition of the 11 and 3 Houſes, is 32.18. And the Poles Elevation above the 12 and 2 Houſes is 47.46.

Now then to find the Cuſpe of the 11 Houſe, look the Oblique Aſcenſion thereof, 102.80. in the Table of Oblique Aſcenſions anſwering to 32.18, of Elevation, and the point of the Ecliptick anſwering thereunto is *Cancer* 24.98.

In like manner, if you look the oblique Aſcenſion of the 12 houſe, 132.80 under the elevation of 47.46. the Cuſpe thereof will be *Leo*, 25,26.

If you look the oblique Aſcenſion of the Aſcendent 162.80. under the Elevation of 51.43 the Culpe thereof will be *Virgo* 17.94.

If you look the Oblique Aſcenſion of the ſecond Houſe 192.80. under the Elevation of 47.46. the Culpe will be *Libra* 9.44.

Laſtly, if you look the Oblique Aſcenſion of the third Houſe, 222.80 under the Elevation of 32.18. the Culpe thereof will be *Scorpio*, 6.35. The other 6 Houſes, are in the ſame Degrees and parts of the oppoſite ſignes.

Precept 7.

The Poles Elevation above the Horizon of a Star is found by the degree of his Declination, in the ſecond Column of the right hand page of your Table, if the Declination thereof be North under the Earth, or South above it; And in the ſecond Column of the left hand page, if the declination be South under the Earth, or North above it, and his diſtance from the Meridian in a ſtraight line, for in the head of your Table in a direct line (uſing a double proportional part if need be) you ſhall have the degree of the Poles Elevation above the Circle of poſition.

Example.

In the preceding figure of the 16 Chapter, the Sun is in *Virgo*, 4.07 and therefore his Declination is 10.05. North above the Earth; his diſtance from the Meridian by the 22 Chapter, was found to be 83.15. Now then to find the Poles Elevation, I look in that Table for the Suns declination in the ſecond Column of the left hand page, and his diſtance from the Meridian in a ſtraight line, and in the laſt folio of that Table, I finde againſt 10 degrees of Declination, the diſtance of a Star from the Meridian neereſt to my number to be 83.37. and over the head thereof 50, which is the degree of the Poles Elevation above that Circle of Poſition.

Aſtronomia BRITANNICA

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LONDON, Printed 1656.

Astronomia BRITANNICA

The second Book

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LONDON, Printed 1676.

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The ſecond Book.

CHAP. I.

Of the year Civil and Aſtronomical.

THe Altitudes of the Planets being given to find their places in the Zodiack, hath been already ſhewed in the *Doctrine of the Sphere*, & thence their annual or periodical revolutions, together with their middle motiõs muſt be ſought, but how to ſtate them ſo exactly as that we may thereby find their true or apparent places for any time required, is that which many have endevoured, but none have as yet found out, at leaſt not ſo, as that their places computed by their rules, ſhall exactly agree with obſervation, nor was *Aſtronomy* brought to that perfection in which it now ſtands but by degrees, and although there hath been very much done of late towards the perfecting thereof, yet ſhall it not perhaps come to its full Acme in this our age. That which we intend, is not to ſhew you from what ſmall beginnings it hath been increaſed, or by whoſe labours, it hath from time to time been ſtill corrected and amended, but to ſhew you how to compute the places of heavenly Bodies, by the plaineſt, ſpeedieſt, and exacteſt ways that are as yet made publike. And in order hereunto we will ſhew you firſt the uſual way of finding out the time in which the *Planets* make their *Annual* or *Periodical* revolutions, and how from thence to compute their *middle Motions*, that their annual revolutions may be known, the time of their entrance into one and the ſame point of the Zodiack, taken in divers years by obſervation muſt be given, with a conſiderable interval of time between theſe Obſervations.

And becauſe the Obſervations taken in any one Meridian (that are as yet publiſhed) are not ſufficient for our preſent purpoſe we muſt of neceſſi-

ly uſe the obſervations made in diverſe places, but the intervall of time between thoſe obſervations cannot be had, unleſſe we can reduce the time of an obſervation made in one account to the like time in another; Although the periodicall revolutions therefore of the planets are the onely proper yeares and firſt in nature; yet ſince the civil yeare in every nation is ſomewhat different from them, we will firſt ſhew the quantity of that in moſt nations, and how to reduce the day of the moneth given in one accont, to the correſpondent time in another.

The *Civil yeare* then, though it doth not exactly agree, yet hath it ſome proportion with the motions of the Sunne or Moone in every nation; Twelve Moones or Moneths is the common meaſure of the year in *Turkey*, in every moneth they have 29 or 30 dayes, in the whole yeare 354, and in every third yeare 355 dayes. The *Perſians* and *Egyptians* do alſo account 12 Months to their yeare, but their months are proportioned to the time of the Suns continuance in every of the 12 ſignes; in their year therefore which is Solar, there are alwayes 365 dayes. And the *Julian yeare*, which is the account of all *Chriſtendome* doth differ from the other onely in this, (that by reaſon of the Suns exceſſe in motion above 365 dayes, which is about 5 hours 49 minutes) it hath a day intercalated once in 4 yeares, and by reaſon of this intercalation it is more agreeable with the motion of the Sun then the former, and yet here is a conſiderable difference between them, which hath occaſioned the Church of *Rome* to make ſome further amendment of the Solar year, but hath not brought it to that exactneſs which is deſired, nor will (as is to be feared) be over-haſtily brought to that exactneswhich it might; taking theſe accounts therefore as they now ſtand, if we will reconcile that diſcrepancy that is between them, there muſt be ſome beginning appointed to every of theſe accounts, and that beginning muſt be referred to ſome one, as to the common meaſure of the reſt.

The moſt natural beginning of all accounts, is the time of the Worlds Creation, but they who could not attain the Worlds beginning, have reckoned from their own, as the *Romanes*, *ab urbe condita*, or from ſome great name or notable event; ſo the *Greeks* account from their *Olympicks*, and the *Aſſyrians* from *Nabonaſſer*, and all *Chriſtians* from the birth of *Chriſt*, the beginning of which and all other the moſt notable *Epochaes*, as others formerly, ſo we now have alſo aſcertained to their correſpondent times in the *Julian Period*, which *Scaliger* contrived by the continual multiplication of three circles all in former times of good uſe, & two of them do-

yet remain; the Circles yet in uſe are thoſe of the *Sun* and *Moon*, the one to wit the Sun is a Circle of 28 years, in which time the *Sunday Letter* makes all the varieties that it can have by reaſon of the *Biſextile* or *Leap-year*, and the Circle of the *Moon* is the revolution of 19 years, in which time, though not preciſely, the Lunations do recur; it is called the *Golden Number*, and was made Chriſtian by the Fathers of the *Nicene* Council, as being altogether neceſſaay to the finding out of the *Neomenia Paſchalis*, upon which the Feaſt of *Eaſter*, and the reſt of the moveable Feaſts depend. The third Circle which now ſerves for no other uſe, then the conſtituting of the *Julian Period*, is the *Roman Indiction*, or a Circle of 15 years, for if you multiply 28 the Cycle of the Sun, by 19 the Cycle of the Moon, the product will be 532, & this by 15, the product will be 7980 the number of years in the *Julian Period*; whoſe admirable condition is to diſtinguiſh every year within the whole Circle, by a ſeveral certain character, the year of the *Sun*, *Moon*, and *Indiction*, being never the ſame again until the revolution of 7980 years be gon about: this *Period*, the Authour fixed in the *Tohu*, or eternal *Chaos* of the World, 764 *Julian* years before the moſt reputed time of Creation; which being premiſed, we will now by example ſhew you how to reduce the years of Forreigners to our *Julian* years, and the contrary.

1 *Example.*

I deſire to know at what time in the *Turkiſh* account, the 5 of *June* 1649, falls. The work is this

The years compleat are 1648, and are thus turned into Dayes, by the table of Dayes, and Decimals of Dayes in *Julian* Years.

1000 *Julian* yeares give dayes	365250
600 years give	219150
40 years give	14610
8 years give	2928
May Compleat Dayes	151
	5
The Summe	602088

Now becauſe the Turkiſh account began *July* the 16. *Anno Chriſti* 622, convert theſe yeares into dayes alſo thus

600 *Julian* years give		219150
20 years give		7305
1 year gives		365
Iune Compleat		181
Dayes		15
	The Summe ſubtract	227016
	From	602088
	There reſts	375072
900 *Turkiſh* years gives		318930
	There reſts	56142
150 years gives		53155
	There reſts	2987
8 years give		2835
	There reſts	152
Gimmadi I. gives		148
	There reſts	4

Therefore the 5th. of *June* 1649, in our *Engliſh* accompt, falls in the *Turkiſh* accompt, in the year of *Mahomet*, or their *Hegira*, 1058, the 4th. day of *Gimmadi II.*

2 *Example.*

I deſire to know upon what day of our *Julian* year, the 23 day of the moneth *Pharmuthi* in the 1912 year currant of the *Ægyptian* accompt from the death of *Alexanders* fall.

The beginning of this *Epocha* is from the beginning of the *Julian* Period in compleat dayes.

1008

		1603397
1000 Egyptian years give		365000
900 yeares give		328500
10 years give		3650
1 yeare gives		365
Phamenoth compleat		20
Dayes		23
	The ſumme	2301145
6000 Julian yeares		2191500
	There reſts	109645
300 yeares give		109575
	There reſts	70
April compleat		59
	There reſts	11

It therefore fell out in the yeare of the Iulian period 6300 the 11 of *March*, that is ſubtracting from that period, 4712 in the yeare of *Chriſt* 1588. He that underſtands this may by like method convert the yeare, of other Epochaes into our Julian yeares and the contrary.

Next to the tables which concern the reduction of years in general, we annexed tables for the perpetual finding of the Sunday letter, Golden nnmber and Epact in both the Old Julian, and New Gregorian accompt, with the fixed and moveable Feaſts, and a Catalogue of ſome famous places with their latitude and diſtance in longitude from the meridian of *London*, whoſe uſe is ſo obvious that it needs but little explanation; yet to take away all difficulty we have added theſe directions.

The *Cycle of Sun*, Sunday Letter, Golden Number and the Epact in both accounts are ſet againſt the yeare of our Lord, and when thoſe years are out, they may be renewed againe as oft as you pleaſe, thus for the yeare 1656 the Cycle of the Sun is 13, the Sunday letters in the Engliſh account are F E, in the Gregorian B A the prime or Golden number in both is 4, the Epact in the Engliſh accompt is 14 in the Gregorian 4.

And now to find the movable Feaſt, ſeek the *Engliſh Epact*, in the firſt Columne of that Table towards the left hand, and the firſt F that follows will ſhew you that the 3d. of *February* is L X X Sunday, the 17 of *Fe-*

bruary

bruary L Sunday, & the 20th of *February Ashwedneſday*, & the firſt E that follows will ſhew that *Eaſter day* is the 6th. of *April*, *Aſcenſion day* the 15th. day of *May*, *Whitſunday* the 25 of *May*, *Corpus Chriſti* the fifth of *June*, *Advent* Sunday, *November* the 30th.

But in the *Gregorian*, the *Epact* and Sunday Letters muſt be ſought in the firſt Columne towards the right hand, ſo ſhall the Sunday Letters B A ſhew the Feaſt of *Eaſter* to be on the 9th of their *April*, and the reſt as in that line they are ſet down.

The fixed Feaſts, together with the Week-day Letters, are ſet againſt their proper dayes in every moneth of the *Julian* year, knowing therefore the Sunday Letter, you may eaſily know upon what day of the Week any Feaſt or day of the moneth ſhall be.

The Catalogue of places doth ſerve to ſhew the height of the Pole in thoſe places, and the Difference of the Meridians of any place in the Catalogue from that of *London*. The Letter S notes that the diſtance is Weſtward, A that it is Eaſtward, the figures under the title of Time are Hours and Decimal parts of an houre, the Earth or any Starre comes ſooner or later to the Meridian of that place then that of *London*.

If the time of a Lunar Eclipſe then or other appearance be given at *London*, afternoon 8 hours, 23 parts, and the time when this happens at *Uraniburge* be inquired, there is found in the Catalogue for *Uraniburge* 0 hour 83 parts A, if therefore according to the letter A, 83 parts be added to the time given it makes 9 houres 06 parts for the time at *Uraniburge*. But if the time of another place be to be reduced to the time at *London*, the difference is to be applied with the contrary title.

And that theſe Reductions whether in time or motion may be the better compared with thoſe bookes that are written in the old Sexagenary forme, we have added tables for the ready converting of Sexagenary parts into Decimall and the contrary, the firſt of theſe tables is for the converting of the Minutes and Seconds, &c. of a Degree in motion; and the other of the parts of a day in time, an example in each will be a ſufficient explanation.

Let it be required to find the Decimall anſwering to $37' 25'' 16''' 5'''' 29''''' in motion.

In the firſt page of the table I find $37' 12''$ which is the neareſt leſſe, and 62 anſwering thereunto, and in the third columne of the ſecond page in the top of the page I find $12''$, in which columne I find 25 ſeconds, and in the ſixt and laſt columne of that page right againſt $25''$, I find this number 36111111, which being annexed to 62. The

The Decimall of 37 minutes 25 ſeconds is	6136111111
And the Decimall of 16 thirds	0000740741
The Decimall of 5 fourths	0000003858
The Decimall of 29 fifths	0000000373
Their ſumme	6236856083
is the Decimall ſought	

2. *Example*

Again, if it be required to find the Decimall of 8 hours, 17 minutes, 8 ſeconds, 5 thirds, 12 fourths, 9 fifts. In the firſt columne of the table entituled, *A Table to convert the hours and minutes of a day into Decimalls*, I find 7 hours 12 minutes, and in the ſecond columne the figure 3, then looking the 12 minutes in the top of the pages, I caſt mine eye downward in that column till I come to 8 hours 17 minutes, and in the laſt columne of the page againſt 8 houres 17 minutes, I find this number 45138889 and therefore,

The Decimall of 8 hours 17 minutes is	345138889
The Decimall of 8 ſeconds	925926
The Decimall of 5 thirds	009645
The Decimall of 12 fourths	0387
The Decimal of 9 fifths	0005
Their aggregate	3452324852
Is the decimall ſought.	

To find the parts of a degree in motion, or of a day in time anſwering to any Decimal given, is but the contrary worke to the former;

Example.

As if it were required to find the parts of a degree anſwering to 6236856083, the 2 firſt figures of this Decimall are 62 which being ſought in the firſt page of the table give me 37′. 12 and 62 being ſubtract from 6236856083, the remainder will be 36856083 which being ſought in the laſt columne, my neareſt number is 36111111, and right againſt that number under 12 in the top of the page I find 25, therefore 37′ 25″ are the parts of a degree anſwering to the Decimall given, but if you would find the thirds, fourths and fifths, from

36856083	
Subtract	36111111
The remainder is	749972

Which being ſought amongſt the Decimals of the thirds, gives me 16 thirds

thirds, and this number to be ſubtracted from it 740741; and the remainder 004231 being ſought amongſt the Decimals of the fourths gives me 5 fourths, and this number to be ſubtracted from it 3858, and the remainder 373 ſought amongſt the Decimals of the fifths gives me 29 fifths, and ſo the parts of a degree anſwering to the Decimall given are 27 minutes, 25 ſeconds, 16 thirds, 11 fourths, and 29 fifths. Thus may you alſo find the parts of a day in time anſwering to any Decimall given.

The next thing to be done towards the finding of the annuall revolutions of the planets is to find their entrance into any point of the Zodiack deſired, and that may be done thus. Having the place of the planet taken by obſervation before and after its entrance into the point deſired, ſubtract the obſerved place next before from the obſerved place next after, and the remainder ſhall ſhew you the apparent motion anſwerable to the time between thoſe obſervation, ſubtract alſo the former place, from the place in the point deſired, and note their difference: for as the former remainder, that is the apparent motion between the obſervations, is to the time between thoſe obſervations: ſo is this difference, to the time between the firſt obſervation, and the planets entrance into the point deſired: thus we are to deal with thoſe obſervations that we our ſelves ſhall make, but one mans age not being diſtance enough between the obſervations from whence the middle motions may be rightly ſtated, we muſt take ſome obſervations upon truſt; and find the middle motions by comparing the obſervations made in former ages with thoſe of our owne, of the Sun or Earth, take this Example following.

The vernal Equinox obſerved by *Hypparchus* in the year from the death of *Alexander* 178, was *Mechir* the 26 day, and 95833333, that is at *London* 86746111. And the vernal Equinox obſerved at *Uraniburgo* by *Tycho* 1588 was *March* the 9th. 86458333, that is at *London* 82986111. And that the interval of time between theſe two vernall Equinoctialls may be known, the 9 of *March* 1588 muſt be reduced to the correſpondent time in Egyptian yeares from the death of *Alexander*, which according to the former directions is thus.

The Chriſtian Æra began in the 4713 complete yeare of Julian period, to which 1587 being added, it makes 6300 from the beginning of the Julian period therefore to the 11 of *March* 1588, there are dayes as followeth.

6300

6000 *Julian* yeares give	2191500
300 years give	109575
February	59
Dayes	28
The Summe	2301142

The *Æra Alexandri* began in the 12 of *November* in 4390 yeare of the *Julian* period in which there are dayes,

4000	1461000
300	109575
80	29220
9	3287
October	304
Dayes	11
Which being subtracted	1603387
From	2301142
There refts	697745
1000 *Egyptian* yeares give	365000
There refts	332745
900 yeares give	328500
There refts	4248
10 years give	3650
There refts	598
1 yeare gives	365
There refts	233
Phamenoth compleate	210
There refts	21

Therefore the 11 of *March* 1588 in our Engliſh account, falls in the 1912 yeare of the *Æra Alexandri* the 21 day of *Pharmuthi*. In which ſpace of time

There are dayes	697748
And from the death of *Alexander* to the 26 of *Mechir* 178, there are	64781
There refts	632965

From dayes 6977[illegible]
Subtract 64781.86748131
There reſts 632964.96240008

And in this time the Earth or Sun hath gone 1733 circles, and 623880 degrees. Hence to find the mean motion for a year or 365 dayes I ſay, If 632964.9624 d. Give 623880 degrees; How many degrees ſhall 365 dayes give?

And the anſwer is 359 deg. 761145603[illegible]. That is in Sexagenary numbers 359 deg. 45 minutes, 41 ſeconds, 1 third, 27 fourths. Again, to find the mean motion for a day I ſay, If 365 dayes gives 359 degrees, 761145603[illegible], what ſhall one day give?

And the anſwer is 0.9856469742. That is in Sexagenary numbers 0 deg, 59 minutes, 8 ſeconds, 19 thirds, 44 fourths.

And what is here done for the middle motion of the Earth or Sun, may be done for the other planets.

CHAP. 2.

Of the figure which the planets deſcribe in their Motion.

HAving ſhewed in the former Chapter, by what means the Annuall or Periodicall revolutions of the Planets may be knowne, with their mean or equal motion, for any part of thoſe revolutions, we ſhould now ſhew you, how by thoſe equal motions to find their true or apparent places. But we can never hope to find the true and exact Phenomenon of the planets, unleſſe we firſt know the figure in which they move; And this muſt be collected from ſuch affections, as are by the conſtant obſervations of all ages found to be proper and naturall to them, or may be rationally collected from them.

1 That the planets have one onely motion, in one onely line, and that thoſe motions are equal, conſtant and perpetual, hath been confirmed by the obſervation of all ages.

2 And therefore they muſt needs be regular, their motions muſt be in a circle, or ſome other line returning into it ſelfe, or elſe their motions could not be perpetuall.

3 Their equall motions muſt have ſome place aſſigned (which the planets naturally behold) to be the beginning of this equall motion.

4 And becauſe the apparent place of a planet taken by obſervation, is genetally different from the place reckoned in its middle motion, the inequality of this middle and apparent motion muſt be referred to the

center of the Zodiacke, as to the point of that inequality.

5 And because the center of the Zodiacke and of the world is to our appearance the same, the point of this inequality must be referred to the center of the world.

6 And because of this difference between the middle and apparent motion, the center of the world cannot be the true and exact center of the planets, but the center of that figure which the planets describe in their motion, must be some other point then the center of the Zodiacke.

7 And though the planets to our appearance are observed to be sometimes swifter in motion, then at other some, yet the cause of this inequality of motion must not be such as shall alter the natural and equal motion of the planet, it must be such as shall make the planet to be slower in its furthest distance from the center of the world, and swifter at his nearest, without transposing the equal motion into any other then the first place assigned, whether superficies or circle.

8 And further the apparent motions of the planets in their nearest and furthest distances from the center of the world being the same with their middle, the way of the planets must be such, that when they have gone 90 degrees from their farthest distance in their middle motions, their apparent motions must be lesse then 90 by the quantity of that whole inequality between the middle and apparent motion; And when the planets have gone a quadrant in their apparent motions, their difference between their motions shall be that whole inequality also, and therefore the center of that figure which the planets describe in their motions must be in the middle between the points of their equal and apparent motions.

9 And because the mean motion from the point of a planets farthest distance from the center of the world, to the first quadrant is greater then the apparent, therefore the apparent motion must be greater then the mean, from the first quadrant to the point of the planets nearest distance, and consequently a greater portion of the line in which the planets move, must be allowed to the apparent from the first quadrant to the point of nearest distance, then from the point of farthest distance to the first quadrant.

10 And because the equal motion must not change and that the apparent motion doth increase from the point of the planets farthest distance from the center of the world, the angles of the middle motion must be reckoned, in the arches of many parallel circles, which shall also increase from the points of farthest to the point of their nearest distance to the cen-

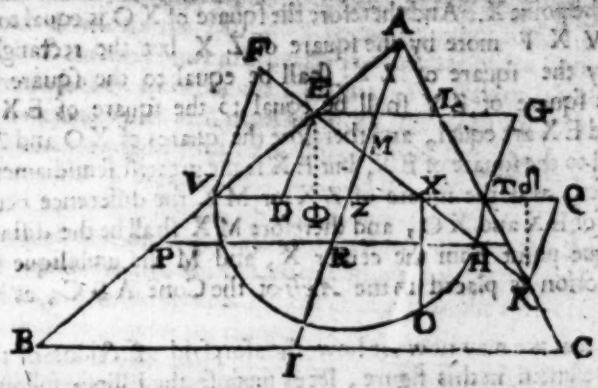
ter of the world, and the line of the apparent motion, muſt containe thoſe circles in one and the ſame ſuperficies, and therefore that line muſt be excentricall from thoſe circles of apparent motion, and ſo placed that all the parts of apparent motion may proportionably anſwer to all the parts of equal, yet ſo as that the leaſt circles of equal motion, ſhall agree with the point of the planets fartheſt diſtance, and the greateſt circles with the point of the planets neareſt diſtance from the center of the world.

Seeing now that theſe circles of middle motion muſt be parallel, ſucceeding one another in a continued ſeries, and are not one within another, and that the apparent motion muſt in the fartheſt diſtance anſwer to the leaſt circles, & in the neareſt diſtance from the center of the world to the greateſt, there is none but a ſolid Superficies that can be capable of thoſe greater and leſſer circles: And that an unequal ſided Cone may be ſo cut, as that the figure upon the plaine of that Section ſhall truly repreſent theſe affections of the planets, the learned *Bullialdus* doth Demonſtrate, and for a preparation thereunto he ſheweth firſt,

How two equal right lines may be ſo drawn in an unequal ſided Triangle, as that the one ſhall biſect the other.

An unequal ſided Cone being cut through the Axis by a plaine perpendicular to the plain of the baſe, ſhall make an unequal ſided Triangle, and let A B C be ſuch a Triangle, whoſe baſe B C let be biſected in I, and parallel thereunto draw the line P S, which being within the triangle ſhall be alſo biſected in the point R, and from a point taken in this line at pleaſure, ſuppoſe at H, to the Axis of the Cone A I, draw the line H M ſo, as that the angles H M R and M R H may be equal; then ſhall H M and H R be equal alſo, and let the line H M being continued to the ſides of the Triangle A B and A C be biſected in the point X, and by the point of biſection at X, draw the line V X T parallel to the baſe B C, then are the right lines E K and V T equal, and E K is biſected by V T in the point X.

From the points E V K draw the lines V F, K Q, E D parallel to A I, ſo ſhall the ſegments P R and R S, V Z and Z T be equal, becauſe the right line A I biſects the baſe B C: and the lines E K and V T being continued to F and Q, the lines F K and V Q ſhall be contained between the parallels F V and K Q, and becauſe the lines E K and D Q are contained between the parallels D E and K Q, and that E X and X K are equal, the triangles E X D and Q K X ſhall be like and the ſides proportionall, that is E X to X D ſo is X K to X Q. And ſo is D E to Q K but E X



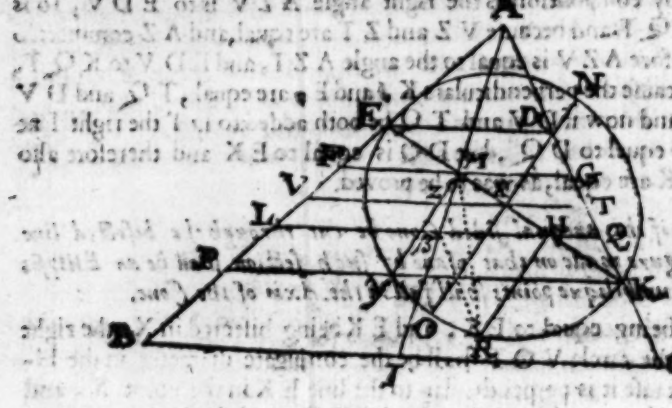
and X K are equal by construction, and therefore X D and X K are equal, and so are D E & K Q and the perpendiculars K ϕ, and E φ shall be equal also. And because H M is equal to H R, & H R, parallel to Z X, therefore as H R, to H M, so is Z X to X M, because E D is parallel to Z M, therfore X M to X E, so is X Z to X D, but X M & X Z are equal, & therefore X E and X D are equal, and the double of them E K and D Q are equal also. And because of the parallels V F, K Q, E D and A Z, it is as A Z to Z V so is E D to D V, and also as A Z to Z T so is K Q to Q T, and by composition as the right angle A Z V is to E D V, so is A Z T to K Q T: and because V Z and Z T are equal, and A Z common to both, therefore A Z V is equal to the angle A Z T, and E D V to K Q T, in which because the perpendiculars K ϕ and E φ are equal, T Q and D V are equal, and now if D V and T Q be both added to D T the right line V T shall be equal to D Q, but D Q is equal to E K and therefore also V T and E K are equal, as was to be proved.

And now if this unequal sided Cone be cut through the bisected line E K, *the figure made on that plane by such section shall be an Ellipsis one of whose umbilique points shall fall in the Axis of the Cone.*

For V T being equal to E K, and E K being bisected in X, the right line X O in the circle V O T shall be the conjugate diameter in the Ellipsis E K, because it is perpendicular to the line E K in the point X, and reacheth to the extremitie of the plain V O T, and it is also a mean proportion

portionall between V X and X T, because it cuts the line V T at right angles in the point X. And therefore the ſquare of X O is equal to the rectangle V X T more by the ſquare of Z X but the rectangle V X T more by the ſquare of Z X ſhall be equal to the ſquare of Z V, and the ſquare of Z V ſhall be equal to the ſquare of E X, becauſe Z V and E X are eqtal, and therefore the ſquares of X O and Z X, ſhall be equal to the ſquare of E X, but E X is the greateſt ſemidiameter, X O the leſſer, and the ſquare of Z X or M X the difference between the ſquares of E X and X O, and therefore M X ſhall be the diſtance of the umbilique point from the center X, and M the umbilique which by conſtruction is placed in the *Axis* of the Cone A B C, as was to be proved.

And that we may now ſee how the aforeſaid affections of the planers are repreſented in this figure, let us ſuppoſe the Ellipſis following to be exactly made according to theſe directions. Let X be the center, M the umbilique point agreeing with the Axis of the Cone, and center of the Ellipſis, whoſe plane parallel to the plane of the baſe is repreſented by the line F M. The conjugate Diameter let be the right line O X N dividing the Ellipſis into two equal parts at the center X, Z is the center of the circle V Z T, the plane and Diameter of which circle paſſe by X the center of the Ellipſis, now becauſe the center is Z and the Diameter V T



their

their M Z and B T are equal, and the plane passing by the Axis doth in like manner divide all the Diameters of all the other circles F D, P G L Q and P K that which runs also parallel to the base of the Cone.

And because the center of the Ellipsis or X is distant from the Axis A I, by the quantity of X Z equal to M N, the plane which bisects the Ellipsis by the conjugate Diameter O X N shall not bisect the circles, but shall cut off V X a greater part towards E, and X T a lesser part towards K.

Let the equal motion of the planet therefore be about the Axis of the Cone A I, and through all the circles which are intercepted between E D and F K, and let the centers of those circles be in the Axis of the Cone, and upon those centers let the planets be conceived to make equal angles in equal portions of time, but the terme of apparent motion to which it is referred, let be the other umbilique or H, the place of the Sun (if we suppose him according to our new Astronomy to be the center of the World.) Then is the Aphelion or part remotest from the Sun at E, the Perihelion or nearest part at K.

And now while the planets describing the Ellipsis shall be equally moved about the Axis of the Cone, in their equal or middle motions, they shall have gone a quadrant about the Cone, when yet they shall want of a quadrant in the Ellipsis by the quantity of the right line M X, and shall be in the point Y, which point is in the circle P M G, and in the Ellipsis, and the right line M Y which is drawn from the center of the circle F G, is set at right angles, upon the Diameters both of its owne circle F G and of the Ellipsis E K, and consequently the angle F M Y is a right angle, and therefore the planets shall move 90 deg. of middle motion about the axis of the Cone when they come to Y, but in the Ellipsis they shall not move so much by the arch Y O, or the right line M X. That this is the true and naturall hypothesis may thus appeare, because

1 The planets thus describe one onely line about the axis of the Cone, in their equal constant and perpetual motions.

2 Their motions thus are regular, though not in a perfect circle, yet in a line returning into it selfe.

3 Their equal motions have their beginning alwayes in one place, that is, in the Axis of the Cone.

4, 5 The apparent motion of the planets is referred to the Sun at H, as to the center of the Zodiac. 6 And the whole inequality between the middle and apparent motion, is between the umbilique points M and H.

7 The

7 The motion of the Planets are thus made to be slower in the *Aphelion*, then in the *Perihelion*, and yet the equal motion is not reckoned any where but in the first place assigned the axis of the Cone.

8 The Planets in their middle motions will thus goe 90 degrees about the axis, being come to Y, when yet they want of a quadrant in the Ellipsis, the arch Y O, or M X, and so the center of the Ellipsis is in X, the middle of the whole Inequality.

9 There equal motions from the *Aphelion* at *E* to the first quadrant are greater then the apparent, but from the first quadrant to the Perihelion at K, the apparent motions are greater then the mean, and therefore a smaller portion of the line which the Planets describe is allowed to the apparent motion from the *Aphelion* to the first quadrant, to wit, F Y, and a greater part from the first quadrant to the *Perihelion*, to wit, Y O R.

10 And lastly, because the circles of middle motion, F G, V T, &c. do increase from the *Aphelion* to the *Perihelion*, & that the Planets notwithstanding make equal angles in equal portions of time about the axis of the cone, their motions in the Ellipsis do increase also from the *Aphelion* to the *Perihelio*, because these greater angles are subtended by greater lines in greater circles, by lesser lines in lesser circles, & because the lesser circles are placed towards the top of the Cone at A, & Aphelion at E, the greater towards the base and Perihelion at K, the motion in the Ellipsis is slower about the Aphelion and swifter towards the Perihelion; And thus the middle motions are not reckoned in one onely circle, but in many parallel circles comprehended between E D and P K, these circles are contained in one plain Superficies, and by these circles the planets describing an Ellipsis doe continually passe, and yet they are all of them excentricall in respect of the figure which the planets describe, as was before required. Thus then there is an admirable Harmony between the motions of the planets in this figure, and their motions in the heavens found by observation; probably therefore we may conclude that the figure which the planets describe in their motions is an Ellipsis.

CHAP. 3.

Of the Lines and Method to be used for the finding of a Planets true longitude from the Aphelion in this figure.

HAving resolved upon the figure which the Planets describe in their motions, we come now to shew you what lines must be drawn, and method used for the finding a planets true longitude from the Aphelion in this

this figure; and in order thereunto, we will shew you first the order of the spheares in which the planets move, and how mechanically to draw this Elliptical figure of their motions upon a plane. As to the Spheares,

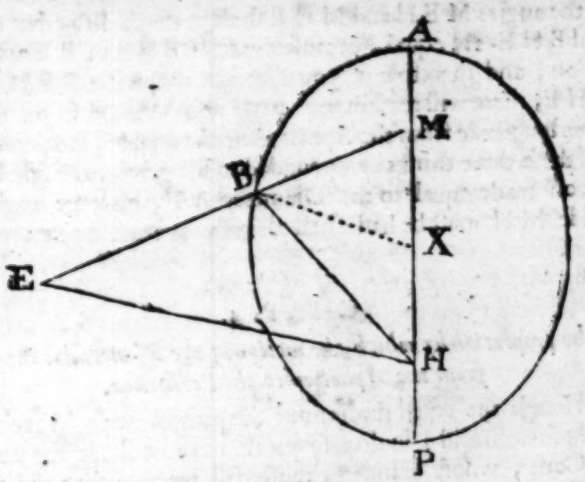
1 We suppose that the Sun is placed in the middle of the world in or about the center of the Spheare of the fixed Starres, and hath no circular motion but centrall onely.

2 That the Earth is one of the planets, and with her annual motion about the Sun describeth her Orbe between the Orbs of *Mars* and *Venus*.

3 That the Moon is moved about the Earth, as her center, and so in her annuall motion hath respect both to the Earth, and to the center of the Earths orbe the Sun.

4 That the Orbe of *Venus* is next under the Orbe of the earth, and the Orbe of *Mercury* between the Sun & the Orbe of *Venus*. Next above the Orbe of the earth we suppose the orbe of *Mars*, the Orbe of *Jupiter* next above *Mars*, and the Orbe of *Saturn* next to the Orbe of the fixed Stars.

According to these supposed principles, we would have immediately shewed the method of calculation, but that the Mechanicall way of drawing an Ellipsis, doth if not demonstrate, yet at least illustrate that method.



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An Ellipſis by the helpe of a thread may be mechanically made thus, firſt draw a right line to that length which you would have the greateſt Diameter to be, which let be A P, and from the middle of this line at X, ſet off with your Compaſſes the equal diſtances X M and X H.

Then take a piece of thrid of the ſame length with the diameter A P, & faſten one end of the thrid in the point M, and the other at H, & with your pen extending the thread thus faſtened to A, & from thence towards P, keeping the thrid ſtiffe upon your pen, draw a line from P by B to A, the line ſo drawne ſhall be an Ellipſis, in which becauſe the whole thread is equal to the Diameter A P therefore the two lines made by the thread in drawing of the Ellipſis muſt in every point of the Ellipſis be alſo equal to the ſame diameter A P, they that deſire a demonſtration thereof Geometrically may conſult with *Apollonius Pergæus*, *Claudius Mydorgius*, or others, in their treatiſes of Conicall ſections; for our preſent purpoſe this is ſufficient, and from the equality of thoſe two lines, with the Diameter, a brief Method of Calculation, is thus demonſtrated by Dr. *Warde*.

Let the line M E be equal to A P, and draw the lines H B and H E, then in the plaine triangle M H E, having the ſides M E equal to the Diameter, and M H the diſtance of the umbilique points, with the angle H M E, the angles M E H and M H E ſhall be given alſo, but the angles B E H and B H E are equal, becauſe the ſides B H and B E are equal by conſtruction, and therefore if you ſubtract the angle B E H from the angle M H E, there will remaine the angle at the Sun M H B, which is a planets true longitude from the Aphelion or the equated Anomaly.

And of theſe three things propounded to be given, the ſide M E is by conſtruction made equal to the Diameter A P, how the angle H M E and the ſide M H muſt be had ſhall plainely appeare by that which followes.

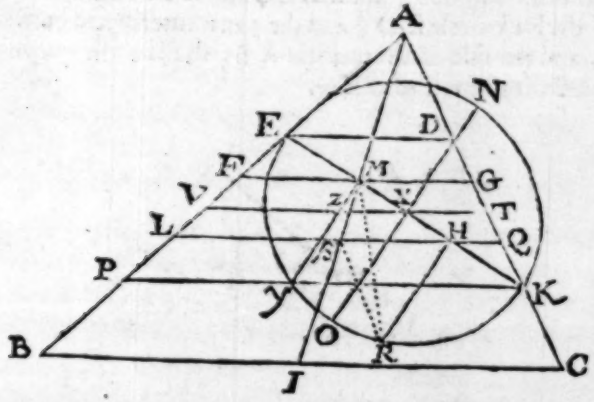
CHAP. 4.

Of the proportion by which the motion of the Planets doe increaſe from the Aphelion to the Perihelion.

THough the equal motions of the planets are to be reckoned (as hath been ſaid) in diverſe parallel circles about the Axis of the Cone, whoſe diameters muſt ſtill increaſe from the top of the Cone at A, to the baſe B C, that the motions of the planets in the Ellipſis may encreaſe alſo; yet in the calculation we cannot conveni-

ently

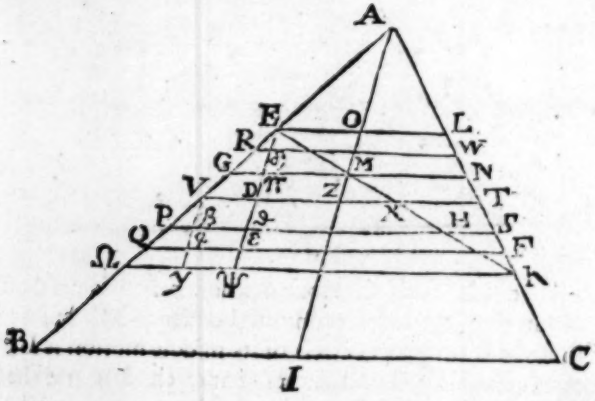
ently reckon the middle motion in any more circles then one, and therefore it must be proved, that the angle comprehended between the lines drawn from E to that point in the diameter of the Ellipsis which is made the common Center of the Circles of middle motion, and from that Center to the planet in the Ellipsis, is alwayes equal to the angle of middle motion, comprehended between the semidiameter of the planets proper circle of middle motion and the line drawn from the center of that circle to the planet in the Ellipsis, this *Bullialdus* takes for granted, and Dr. *Ward* doth thus demonstrate.



F M G is a circle of middle motion whose center is in the Axis of the Cone, and in the umbilique point of the Ellipsis M, but a planet being in the Ellipsis at R the proper circle of its middle motion is L ☾ Q and the angle comprehended by the Radius of that circle L ☾, and the line drawn from ☾ the center thereof to R the place of the planet is equal to the angle comprehended between the line E M and the line drawn from M to R in the Ellipsis, for thus there are made two right angled triangles M H R and ☾ H R, in which the side H R is common to both, for it is set at right angles in the Ellipsis and in the circle equant, and the sides M H and ☾ H are equal by what hath beene already said in the 2 Chapter, therefore the angle R M H is equal to the angle R ☾ H, and by consequence R ☾ L and R M E are equal also, but the angle R ☾ L is the angle of the middle motion of a planet from the Aphelion, or the angle of the simple excentricke anomaly, and therefore the angle R M E is the mean anomaly also, whose complement to a semicircle is the angle M E H in the Diagram of the preceding Chapter.

When a Planet therefore descends from E to K, the angles at the axis of the Cone, or at M the umbilique point of the Ellipsis do alwayes increase, and therefore the meane anomalie is increased, for the angles of its circle Equant do answer to more degrees at the axis, and those angles also, are alwayes degrees or parts of greater circles, and therefore the planets increase in the swiftnesse of their motion in such proportion as the circles, Diameters, or Radii of those circles equant do increase.

For Demonstration whereof let the line E ↓ be made parallel to the axis of the Cone, then shall the parts of the semidiameters of the circles equant comprehended between those parallels E ↓ and A I be equal to the semidiameter of the least circle E O, and the parts intercepted between that parallel E ↓ and the side of the triangle A B, shall be the proportionall excesse above the least motion in E O.



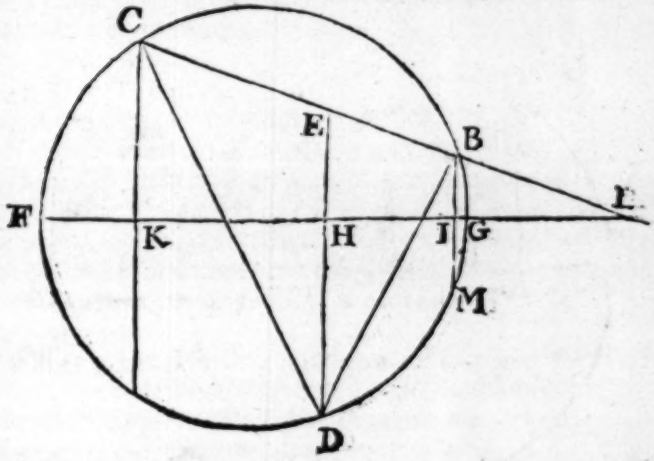
And the mean acceleration is in that circle equant whose plain parallel to the base of the cone doth pass by the center of the Ellipsis, that is in the circle V D T, for seeing that M X & Z X are equal, as also V D & Z X, V D must needs be the difference between the semidiameter of the least circle E L & the middle circle V T, & the excess of that semidiameter, above the semidiameter of the least circle, must be equal to M X or the exeentricity, but the distance of this circle from the Aphelion is 90 degrees, and may be called the Diacentrick circle, and is the Radius of the circle of the equated anomalie E X And the difference between the semidiamater of V T, and the parallel circle ω K is also equal to M X, for as E V to E ω so

is E X to E K, and again, as E V to E ☉ so is V D to ☉☿, and because E X is the halfe of E K, therefore V D shall be equal to ☉ Y or to the halfe of ☉☿, and therefore ☉ Y is also equal to M X, when a planet therefore is in the circle V T, it is swift in motion, and is in the middle between the swifteſt and the sloweſt motion, and because that middle acceleration of the planets, is the acceleration in a quadrant, therefore as E X to V D, so is E M to G ♈. That is, as Radius to the excentricity, so is the verſed sine of the distance from the Aphelion, to the part proportionall of the planets acceleration; and therefore also (saith *Bullialdus*) it is as the whole sine, to the whole difference, so is the sine of the distance of the middle motion from the Aphelion, to the part of the difference answering to that distance. From hence and the two following problemes of *Vieta*, he propounds a method for the finding of the Aphelion and distance of the umbilique points.

Probleme 1.

Three points in the circumference of a circle being given, to find a diameter, upon which there being perpendiculars let fall from the points given; the segments of the diameter intercepted by these perpendiculars shall be proportional to another proportion given.

In the circle B C D whose center is A, let the points given be B, C, D, and let it be required to find the diameter of that circle upon which per-



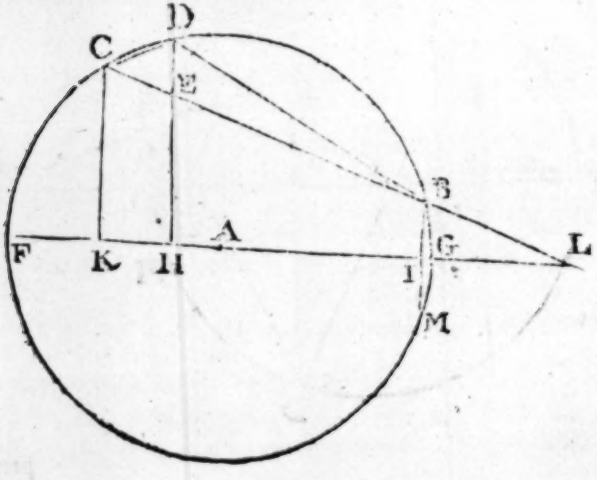
pendiculars

pendiculars being let fall fall from the points B, C, D, the ſegments of the Diameter ſhall be proportional to another proportion given: let the proportion of the ſegments intercepted by the perpendiculars let fall from B and C be required to be as S to R.

Let the line CB be cut in E, ſo as CB may be to EB, as S to R, and let DE, cut the Diameter FG at right angles in H. Then is FG the Diameter ſought, upon which ſeeing the lines BI, CK, DH doe fall perpendicularly, KI ſhall be to HI as S to R.

For the right lines CB are parallel, or not parallel, if they be parallel, CB ſhall be equal to KI, and EB to HI, and then by conſtruction KI ſhall be HI, that is CB to EB, in the given proportion as S to R. But if they can meet, let the point of their meeting be at L. Then it ſhall be as LC to LK, ſo LE to LH, and ſo is LB to LI. And then dividing and changing the termes, it ſhall be as KI to HI, ſo is CB to EB, or ſo is S to R as was required.

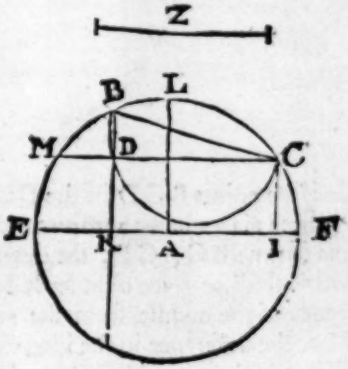
And thus likewiſe KH and HI, with the arches BC, CD, and BD, being given, we may find the arch BG, and the Diameter FG in the ſame parts with KH and HI, for the arches CD and DB being given, the ſubtenſes of thoſe arches and angles oppoſite to them in the triangle BCD ſhall be given alſo in the parts of the Diameter FG, and therefore the ſides EB and DB with the angle EBD being given, the angle EDB or DBM ſhall be given alſo, which being deducted from the arch BMD ſhall leave BM or the double of BG.



Probleme 2.

Two points in the circumference of a given circle being given, to find the Diameter, upon which perpendiculars being let fall from the points given, the ſegment of the Diameter intercepted by thoſe perpendiculars ſhall be equal to a line given.

In the circle B C whoſe center is A, let the given points be B C, let the given line be Z. Subtend the periphery B C, and let the right line B C be made the Diameter of a circle, in which draw the line C D equal to Z. But by the center let there be drawn E F the Diameter of the circle B L C parallel to D C, and then the perpendicular B D being let fall upon M C, the angle B D C ſhall be a right angle.

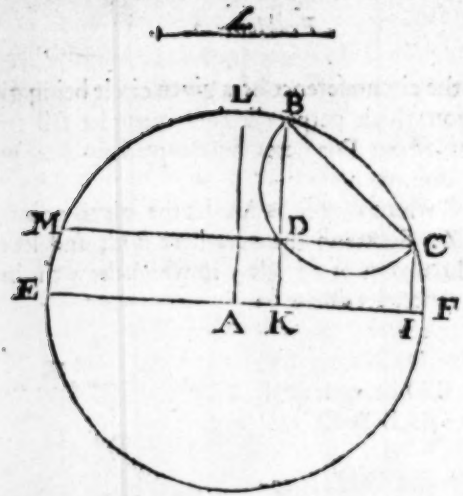


And becauſe E F and D C are parallel, B D ſhall cut E F at right angles in the point K, and B K ſhall be parallel to C I, and therefore D C and K I ſhall be equal, therefore in the circle B C, the points B and C being given, there is found the Diameter E F, upon which the perpendiculars B K and C I being let fall, the ſegment K I intercepted by thoſe perpendiculars is equal to C D that is to Z the line given.

Thus likewiſe the ſumme of the arches, and the ſumme of the Sines of theſe arches being given, we may diſtinguiſh the arches and the Sines if the center A be between K and I. Or the difference of the arches and the difference of their ſines being given, we may diſtinguiſh the arches and the ſines, if the point K be betweene the center A and the point I.

When three places therefore in the apparent motion of the Sun or any other planet, with the intervall of time are given, the middle motion of the planet ſhall be given alſo, with the difference between the middle and apparent in thoſe intervalls, and the reſt from theſe.

For



For if the points B C D in the Diagrams of the first probleme be given, to wit, three places in the apparent motion, & the middle motion in the intervalls of time B C, C D, the difference between the middle and apparent motion shall be given also; let K I the part of the diameter F G, be the difference of the middle from the apparent in the intervall B C, and let H I be the difference in the intervall B D.

Then in the triangle B C D, the arches B C and C D are known, and therefore the angles at D and B are known also, and by consequence the third angle at C, and from thence the subtense C B, now that we may find the angle E D B, the side C B must be cut in the same proportion as the line K I is cut in H. That so K I may be to H I as C B to E B. And so we shall have E B in the like parts with B D; and the sides E B, B D, with the angle at B, in the triangle B E D being given, the rest shall be given also, and the angle at D being given, we shall have the arches M B and M D.

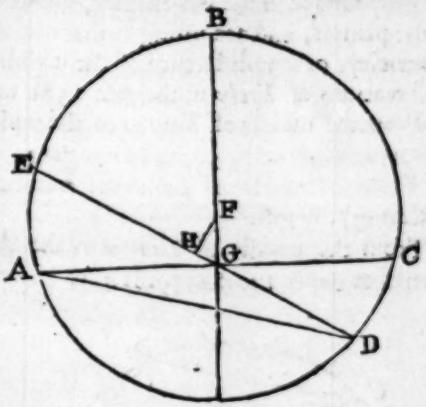
And lastly, F G shall be given in the like parts in which K H, and H I are given. For as the summe of the Sines complement B I and C K, to K I, so is the Diameter F G, to the same diameter in the parts of K I: and so the first inequality shall be given, and the diameter from whence it begins.

CHAP.

CHAP. 5.

Of the inequality of the Earths annual motion, and of the Diameter in which the Aphelion and Perihelion are placed.

THe inequality of the Earths annual motion, if we ſuppoſe the motion to be exactly circular, may from the Obſervations of *Copernicus* made at *Frwenburg* in *Pruſſia*, 1525, or rather as they were corrected by *Tycho*, 1584 be they found; Between the Autumne and the Vernal Equinox, according to *Tycho* there were dayes 178.43333.33333. And between the Autumne Equinox, and the middle of *Mars* there were dayes 45.15416.66667.



Upon the Center F deſcribe the Suns Orbe A B C, let A be the Vernal Equinox the the Autumne, D the middle of *Mars*, and let D E interſect A C in the point G, and draw the line A D: Then is the ark of middle motion C D 44 degrees, 50611111111, and therefore the angle C A D, 22.25305.55556. and the angle of apparent motion C G D 45 degrees, which being deducted from 180 degrees, give the obtuſe angle A G D, 135 degrees.

And therefore the angle C D G 22.74694.44444.

And the arch A E 45.49388.88889.

Again, the ark C D A, 175 deg. 87500.00000. from which deducting C D 44.50611.11111. the remainder is D A, 131.36888.88889. The ſubtenſe A D 18225828. to which A E being added, the whole is D E, 176.86277.77778. and the ſubtenſe of D E, 19992506. And becauſe that neither of theſe Segments do make a Semicircle, we muſt find the Aphelion in the other part of the circle E B C. Let the line E B repreſent the Aphelion and Perihelion, G F the excentricity, F H then being drawne perpendicularly ſhall biſect D E and make right angles in the point H.

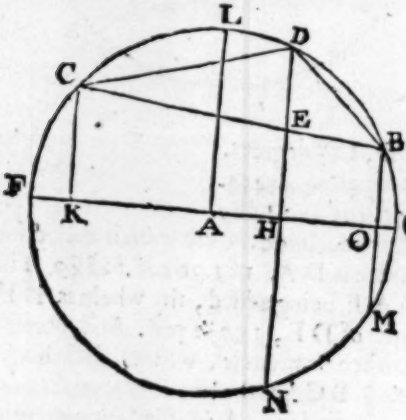
And in the triangle A G D, the angles being given with the ſide A D, there is alſo given G D 976358$, whch being deducted from the halfe of D E there ſhall remaine G H 232668, and the perpendicular F H may be thus found, D A E wants deg. 3.13722.22222 of a ſemicircle, the halfe whereof is 1.56861.11111, whoſe ſine 273740 is the ſide F H, now then H G and F H being given, we may find the angle F G H 49.63666.66667, which with the arch A E 45.49388.88889 makes 95.13055.55556, therefore the Aphelion is ☌ 5.13055.55556, or in ſexagenary numbers, in 5 degrees of *Cancer* 7 min. 50 ſeconds. And the excentricity F G 359261.

But the method for the finding of the Aphelion and excentricity which we propounded in the laſt chapter, is more ſutable to the Elliptical motion of the planets, and according to that method the earths Aphelion and Excentricity, or ſemidifference of the umbilique points, from the accurate obſervations of *Tycho* in the year 1588 may be thus found.

From the middle of *Taurus* to the middle of *Leo* there were dayes in the apparent motion, 94.24662.03703.

From the middle of *Leo* to the Autumne Æquinox there were dayes 46.40277.77778.

From the middle of *Taurus* to the Autumne Æquinox there were therefore dayes 140.64939.81481.



In the annexed Diagram let C repreſent *Taurus* 15 deg. D 15 deg. of *Leo*. Then ſhall the arch of apparent motion C D be 90 deg. and D B 45, but in the middle motion the arch C D ſhall be 92.89277, and D B 45.73777, and C B 138.63055.

Firſt,

First, we will worke with the arches of apparent motion.

Arch.	*Deg.*	*Angles*	*Deg.*	*Sides*	
CD	90.00000	CBD	45.00	CD	70711
DB	45.	DCB	22.50	DB	38268
CB	135.	CDB	67.50	CB	92388

The halfe differences of the middle from the true.

1 Deg.	1.44638	KH	2524
2 Deg.	0.36888	HO	644
Deg.	1.81526	KO	3168

As KO	3168	*co. arith.*	6.4992149
To CB	92388		4.9656155
So is HO	644		2.8088858
To EB	18780		4.2737152

And now in the triangle EDB we have the sides DB 38268, EB 18780, and the angle EBD 45 deg. to find the angle EDB.

As the ſumme of DB and EB	57048	*co. ar.*	5.2437596
To their difference	19488		4.2897673
So the tangent of ½ D and E	67.50		10.3827756
To the tang. ½ the difference	39.51283		9.9163025

The angle EDB 27.98717 and the double thereof is the arch BMN 55.97434 from whence taking MN equal to DB 45 there reſts BM 10.97434, and the halfe of that is BG 5.48717, and the ſumme of DB and BG 50.48717, now D repreſents the 15 deg. of *Leo* and the complement of DG to a quadrant is the arch DL 39.51283 from the vernall Equinox to the 15 deg. of *Leo* is 135 deg. from which deducting DL 39.51283, there reſts for the point of the Aphelion at L 95.48717, that is in *Cancer* deg. 5.48717. And now to find the Semidiſtance of the umbiliques, As the ſumme of the Sines of the complements of BO and CK, is to KO, So is the Radius AG to the ſame Radius AG. Now if you deduct 15 deg of *Taurus* from *Cancer* 5.48717 the arch CL will be 50.48717 and BG 5.48717 being deducted from LG 90, there reſts LB, 84.51283 the ſine of LC is KA 77148 and the ſine of AO 99541 and the ſumme of KA and AO is 176689 now then,

As the ſumme of K A and A O 176689	*co. ar.*	4.7527094
Is to the ½ difference K O 3168		3.5007851
So is the Radius A G 100000		
To the ſame Radius A G in the parts of K O 1792		8.2534945

or degrees 1.02139 halfe the inequality deſired.

But if we take the arches of Middle motion the calculation will be as followeth,

Arch.	*Deg.*	*Add*	*Ded.*	*Sides.*
C D	92.89277	C B D	46.446 85	C D. 72473
D B	45.73777	D C B	22.868885	D B. 38862
C B	138.63054	C D B		C B. 93554

Halfe the differences of the middle from the true, as before.

1 Deg.	1.44638	K H 2524.14119
2 Deg.	0.36888	H O 643.81259
Deg.	1.81526	K O 3167.95378

As K O 3168	*co. arith.*	6.4992149
Is to C B 93554		4.9710623
So is H O 644		2.8088858
To E B 19018		4.2791630

And in the triangle E D B the angle at D may be thus found.

The ſide D B is	38862	
The ſine E B is	19018	
The ſumme is	57880	5.2374765
The difference	19844	4.2976292
Tangent ½ D & E	66.77681	10.3674618
To the tangent ½	38.62586	9.9025625

28.15095 the angle E D B and the double thereof is the arch B M N 56.30190 &
from thence taking M N equal to D B 45.73777

There reſts B M 10.56413 and the half of that is B G 5.282065. and the ſumme of D B and B G 51.01997. Now D repreſents the 15 degrees of *Leo*, and the complement of D G to a quadrant is D L 38.9800 : from the Vernal Equinox to the 15 deg. of *Leo*, is 135 deg. from which deducting D L. 38.98003, there reſts for the point of the Aphelion at L, 96.01997. that is in *Cancer*, 6 deg. 01997, from which the difference between the true and mean motion in that interval being deducted 73776, the place of the Aphelion will be in *Cancer*, 5.28221.

And

And to find the Semidiſtance of the umbiliques deduct 15 deg. of *Taurus* from *Cancer* 5.28221, there will remaine for the arch C L 50.28221, and B G 5.28206 being deducted from L G 90 there reſts for the arch, L B 84.71779, the ſine of C L is K A 76921

The ſine of L B is A O		99575	
As their ſumme	1764964	ca. ar.	4.7532652
Is to K O	3168		3.5007851
So is the Radius A G			10.0000000
To the ſame A G	1795		8.2540503

This excentricity *Bullialdus* corrects by the appaſent places of the planets in the center of the Ellipſis, and that angle according to the Method of our calculation may be thus found.

From 15 degrees of *Taurus*, or from		225. deg.
Deduct the Aphelion		095.28221
There reſts the angle M H E		129.71779
whoſe complement to 180 deg. is		50.28221
the ſumme of M E H and E M H and the halfe thereof		25.14110
The ſide H E	200000	
The ſide M H	3590	
The ſumme	203590	4.6912436
The Differ.	196410	5.2931636
Tang. ½ ſumme	25.14110	9.6714590
Tang. ½ differ.	24.35902	9.6558662

The ſumme 49.50012 E M H
Difference 00.78208 M E H being doubled is the angle M B H 1.56416

From E M H	49.50012
Deduct M E H or E M B	00.78208
There reſts B M H	48.71804

As

As the sine of M B H	1.56416	co. ar.	1.3658976
Is to the side M H	3590		3.5550944
So is the sine of B M H	48.71804		9.8759126
To the side B H	98833		4.9949046
The side X H	1795		
The Summe	100628	co. ar.	4.9972811
The Differ.	97038		4.9869418
Tang. ½ sum	25.14110		9.6714590
Tang. ½ Dif.	24.34989		9.6556819
Differ.	0.79121	X B H.	

From the 15 deg. of *Taurus* or from 45 — 45.
Deduct the angle X B H — 00.79121
There rests the place required — 44.20879
Again, from 0 deg. of *Libra* or from — 180.
Subtract the Aphelion — 95.28221
There rests the angle M H E — 84.71779
And therefore ½ of M E H and E M H — 47.64110

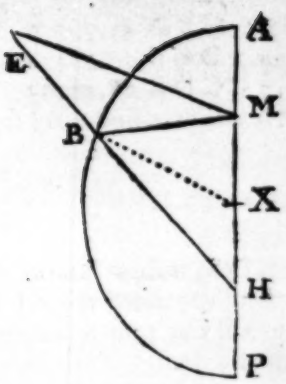
The side H E	200000		
The side H M	3590		
The Summe	203590	co. ar.	4.6912436
The Differ.	196410		5.2931638
Tang. ½ summe	47.64110		10.0400951
Tang. ½ Differ.	46.61542		10.0245023

Aggregate 94.25652 E M H
Difference 1.02568 M E H which being doubled is the angle M B H 2.05136

From E M H — 94.25652
Deduct M E H — 1.02568
There rests B M H — 93.23084
whose complement is A M B — 86.76916

As the sine of M B H	2.05136	co. ar.	1.4461743
Is to the side M H	3590		3.5550944
So is the Sine of B M H	86.76916		9.9993071
To the side B H	100132		5.0005758
The side X H	1795		

The



The ſumme	101927	*co. ar.*	4.9917108
The differ.	98337		4.9927169
Tang. ½ ſumme	47.64110		10.0400951
Tang ½ differ.	46.61677		10.0245228
Differ.	1.02433 The angle X B H.		
And therefore the Earths place			181.02433
Now then from the Aphelion			95.28221
Subtract *Taurus*, that is			44.20879
There reſts the arch C L			51.07342
And from L G			91.02433
Deduct B G			5.28206
There reſts the arch L B			85.74227

77795 is the ſine of 51.07342
99724 is the ſine of 85.74227

Summe 177519			
As the ſumme 177519		*com. ar.*	4.7505576
Is to K O 3168			3.5007851
So is A G 100000			5.0000000
To the ſame A G 1784			3.2513427

But according to this method, the Aphelion may be ſomewhat more exactly found, if we take the Arithmetical mean, between the apparent and middle motion, and ſo;

Arch.

Arch. Deg	*Angle Deg.*	*Side*
C D 91.44638	C B D 45.72319	C D 71597
D B 45.36889	D C B 22.68444	D B 38565
C B 136.81527	C D B 68.40763	C B 92983

Now then to find E B I say,

As K O 3160		*co. ar.*	6.4992149
Is to C B 92983			4.9684035
So is H O 644			2.8088858
To E B 18902			4.2765042

Then in the triangle E D B, we have known the side D B 38565, the side E B 18902, and their contained angle E B D 45.72318, whose complement to a semicircle is 134.27681. The half summe 67.13840.

As the summe of D B and E B 57467		*co. ar.*	5.2405815
Is to their differ.	19663		4.2936497
So is Tang. $\frac{1}{2}$ D and E	67.13840		10.3750715
To the Tang $\frac{1}{2}$ differ.	39.06019		
Differ.	28.07821 the angle E D B		

The angle E D B	28.07821
E D B doubled is the arch B M N	56.17926
From which subtract M N or D B	45.36889
There rests B M	10.78753
The halfe of B M is the arch B G	5.39376
And D B being added to B G, D G is	50.76265
And the complement thereof is D L	39.23735
Which being deducted from ☊ or	435.00000
There rests the Aphelion at L	95.76265
And the halfe difference D B	0.36889
Being deducted there rests	95.39377
The Aphelion then is in *Cancer* 5 deg.	39377
And to correct the excentricity from the 15 degree of *Taurus* or adding a semicircle from	225.
Deduct the Aphelion	95.39377
There rests in the Ellipsis M H E	129.60623
whose complement to 180 is the summe of the opposite angles M E H and E M H	50.39377

In

In the Triangle therefore of the laſt Diagram M E H, we have,

1. The ſide H E 200000
2. The ſide H M 3568
3. The angle M H E given

As the ſumme	203568	*co. ar.*	4.6912904
To the difference	196432		5.2932122
So tang. halfe ſumme	25.19688		9.6724222
To tang. halfe differ.	24.41154		9.6569248
Aggregate	49.60842	the angle E M H	
Difference	00.78534	the angle M E H	
Differ. doubled is	1.57068	the angle M B H	
Differ. ſubtracted	48.82308	is the angle B M H.	
As the ſine of M B H	1.57068	*co. ar.*	1.5620900
To the ſide M H	3568		3.5524248
So is the ſine of B M H	48.82308		9.8766104
To the ſide H B	97977		4.3911252
The ſide X H	1784		
The ſumme	099761	*co. ar.*	5.0010393
The differ.	96193		4.9831434
Tang ½ ſumme	25.19688		9.6724222
Tang. ½ differ.	24.39566		9.6566049
Differ.	00.80122	the angle X B H which being ſubtracted	

from 15 degrees of *Taurus*, or from 45 deg. there reſts 44.19878 the

Aphelion	95.39377
Place of the earth ſubtract	44.39878
There reſts the arch C L	51.19499

Againe from 0 degrees of *Libra* or from 180.

Deduct the Aphelion	95.39377
There reſts in the Ellipſis M H E	84.60623
And therefore the ½ ſumme of the angles E M H and M E H	47.69688

As the ſumme	203568	*co. ar.*	4.6912904
To the differ.	196432		5.2932122
So tang. ½ ſumme	47.69688		10.0409444
To tang. ½ differ.	46.67763		10.0254470
Aggregate	94.37451	angle E M H	
Difference	01.01925	angle M E H	
Differ. doubled	2.03850	angle M B H	
Differ. ſubtract	93.35526	angle B M H	

As the ſine of M B H	2.0385	co. ar.	1.4489645
To the ſide M H	3568		3.5524148
So is the ſine of B M H	86.64474		9.9992548
To the ſide H B	100134		5.0095839
The ſide X H	1784		
The ſumme	101918	co. ar.	4.9917492
The differ	98350		4.9927743
The tang. ½ ſumme	47.69688		10.0409444
Tang. ½ differ.	46.67901		10.0254679
Difference	01.01787, X B H which being added to ♈ the		

place will be 181.01787, from which ſubtract B G 5.39376 there reſts 175 or L B 85.62411.

The ſine of C L	77927		
The ſine of L B	99707		
As the ſumme	177634	co. ar.	4.7504740
Is to K O	3168		3.5007851
So is A G	10000		5.0000000
To A G	1783		3.2512591

which comes ſo neer to the Excentricity before found that we may without manifeſt error make uſe of either.

CHAP. 6.

Of Stating the Earths middle motions by ſundry obſervations.

TO find the Earths middle motion for any time under a yeare, the way already preſcribed in the firſt Chapter (as to the uſe for which it was intended) is exact enough, but to ſtate the true quantity of the Earths annual motion, the apparent Equinoctials muſt be reduced into the mean, which cannot be done unleſs the Aphelion be firſt found, having found that therefore by the obſervations of *Tycho*, we will now find it by the obſervations of *Albategnius*, in the year from the death of *Alexander*, 1206, and the intervall of time then between the Autumne and the Vernal Equinox was dayes 178.51250, and the middle motion for that time, is deg. 175.95083. The true motion is 180.

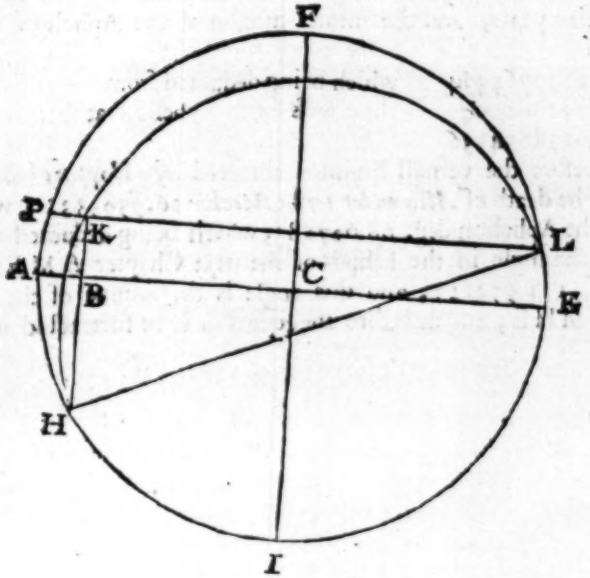
From

From which subtract		175.95083
Their difference is		4.04917
The half difference is K L		2.02458
Therefore as A E 3568	com. ar.	6.4475752
To A E 100000		5.0000000
So is K L 3533		3.5481436
To K L 99019		4.9957188

Half the arch H I L is 87.97541, whose sine 99938 is the side H L, and therefore,

As the side H L 99938	co. ar.	5.0002727
Is to Radius, so is K L 99019		4.9957185
To the angle K H L 82.22718		9.9959912

And the angle H L K 07.77282 — And L F K 168.50353
And the arch H K 15.54564 — And L F 84.25176
The arch H I L add 175.95083 — The place of the Aphelion at F
The arch L I H B 191.49647



This Autumne Equinox was obſerved *September* the 19th. from the death of *Alexander* 1206 yeares, that is in the yeare of our Lord 882. In the beginning therefore of the yeare of Chriſt 883, the Aphelion was in *Gemini* 24 d. 25176

And in *June* 1588, the Aphelion was in *Cancer* 5. 39377

Their difference is 11. 14201

And betweene both obſervations there are 706 Egyptian years, now then to find the mean motion of the Aphelion for a yeare I ſay, If 706 years give 11.14201, what ſhall one yeare or 365 dayes give? and the anſwer is Deg. 0.01 57818838

And againe, if 365 dayes give 01 57818838 oneday ſhall give 0 deg. 0000432380.

In 882 Julian years there are 322150 dayes, by which if you multiply 00c0432380 the product will be deg. 13. 9291217, which being deducted from the aphelion before found, *Gemini* 24.25176, the aphelion in the beginning of the Chriſtian Æra will be in *Gemini* 10.3226383, that is, 19′ 21″ 29‴.

But from *Hypparchus*, that is from 177 yeare from the death of *Alexander* to the 1205 yeare compleate in the ſame account, there are 1028 Egyptian years, and the meane motion of the Aphelion in that time is,

Deg. 16.2237765464 which being deducted from

Gemini 24.2516600000 there reſts for the aphelion at that time.

Gemini 08.0278834536

And therefore the vernall Equinox obſerved by *Hypparchus* in the yeare from the death of *Alexander* 178 *Mechir* 26.9583333, was diſtant from the Aphelion deg. 68.027883, which being deducted from a Semicircle the angle in the Ellipſis of the next Chapter A M E will be found to be 111.972117, and this angle is the ſumme of the angles M E H and M H E, and therefore the equation to be ſubtracted may be thus found.

The

The ſide M E	200000		
The ſide M H	3568		*Logarithms*
The ſumme	203568	*co. ar.*	4.6912905
The Differ.	196432		5.2932122
The tang. ½ ſumme	55.98606		10.1707846
Tang. ½ differ	55.03186		10.1552873
Differ.	00.95420	angle M E H	
Differ. doubled.	01.90840	angle M B H	

or the Equation ſought: which may be converted into time thus, if the parts of a degree of equal motion, 98564 give one day; 1.90840 ſhall give 1.93620, and this being added to the true Equinoctial, *Mechir* 26.95833 the middle will be *Mechir* 28.89453, or deducting 05625; for the difference of meridians between *Uraniburge* and *Alexandria*, it will be at *Uraniburge*, *Mechir* 28.83828. And the vernall Equinox obſerved by *Tycho* at *Uraniburge* 1588, was *March* the 9.86458, and the Earths aphelion then was in *Cancer* 5.39377; and therefore the arch anſwering to the excentricity 3568, *viz.* deg. 2.04529 being converted into time as before, will be days 2.07508, which being added to the former time the middle Equinoctial wil be *March* the 11.93966. And in the Egyptian account from the death of *Alexander* it was 1912 *Pharmuthi* 23.93966, from which if you deduct in the ſame account 178, *Mechir* 28.83828 between both obſervations there will be found 1734 Egyptian years, dayes 55.10138, which being converted into dayes give 632965.10138. Hence to find the quantity of the Tropicall yeare, I ſay, if 1733 Zodiacks give dayes 632965.10138, that one Zodiack ſhall give dayes 365.241835712 6. And to find the earths middle motion for a yeare, I convert 1733 Zodiacks into degrees, and they amount to 623880 degrees; then I ſay, if 632965.10138 give 623880, that 365 days ſhal give 359.761066661098 that is in Sexagenary numbers 359 deg. 45 minutes, 39 ſeconds, 50 thirds, 24 fourths. And to find the meane motion for a day, I ſay, if 365 dayes give 359.761066661098, that one day ſhall give 985646757, that is in Sexagenary numbers 0 degrees, 59 minutes, 8 ſeconds, 19 thirds, 41 fourths, 57 fifths.

And

And the daily motion of the Aphelion is 0000432380, which being deducted from the diurnall longitude gives the daily motion of the Anomaly 985603599, these things premiſed we will now determine the Epochaes of the middle motions.

The middle Equinoctiall *Anno Chriſti* 1482, *March* 11.93966, is from the *Æra Nabonaſſari* 2336 *Pharmuthi* 23.93966. 2335 years being multiplyed by 359.761067 the product will be 840042.091445, and the diurnal motion 985647, being multiplied by 232 days, the product will be 228.670104 and the middle motion anſwering to the parts of a day, 93966, is 926173, the which being added togethea do amount to 840271 degrees 687722 parts of a degree, that is, rejecting the whole circles 31 d. 687722, which being deducted from 360, the remainder 328.312278 or 10 Signes 28 degrees and 312278 parts, is the Radix of the earth or Suns mean longitude in the beginning of the *Æra Nabonaſſari*. To which if you add deg. 258.692408 the middle motion for 424 years, the whole circles being rejected, the Radix of the earths middle motion to the beginning of the *Æra Alexandri* ſhall be 227.004686 or 7 ſines 17 deg. 004686 parts. And adding to this Epocha, deg. 51.944398, which is the middle motion for 323 years 131 dayes, the whole circles being rejected, the Radix of the earths middle motion in the beginning of the Chriſtian *Æra* ſhall be deg. 278.949084 or 9 ſignes, 8 deg. 949084, to which if you add 034223 the equal motion belonging to 034722 the difference between the Meridians of *Uraniburge* and *London*, the Radix of middle motion at *London* will be 278.983307

And the Aphelion	70.322638
And the Mean Anomaly	208.660669

CHAP. 7.

To calculate the Suns true place and diſtance from the Earth.

HAving compoſed tables of the Suns middle motions, according to the directions of the laſt Chapter, his true place in the Zodiack, and diſtance from the earth may thus be found.

1 Write out the Epocha next before the given time and ſeverally under that, ſet the motions belonging to the years, moneths, and days compleat, and to the houres and ſcruples current, every one under his like (onely remember that in the Biſſextile year, after the end of *Febru-*

ary

ary, the dayes muſt be increaſed by an Unite) then adding them altogether, the ſumme ſhall be the Suns meane motion for the time given.

Example.

Let the time given be *May* the 12th. houre 11 parts 15 before noone at *London* in the Biſſextile yeare 1656, and the Suns place to be ſought: The numbers are thus,

		Suns Longitude Deg. parts	*Suns Apogeon* Deg. parts
The Epocha	1640	291. 24777	96.22263
Years comp.	15	359. 37294	23685
April		118. 27760	519
Dayes	12	011. 82776	52
Houres	23	94458	
Scruples	15	616	
Suns Mean Longitnde		421. 87681	96.46522

2 Subtract the *Apogeum* from the Mean Longitude, there reſts the means Anomaly.

Example.

The Suns mean longitude	421.67681
Apogeum ſubſtract	96.46522
Reſt mean Anomaly	325.21459
Whoſe complement to a Circle	34.78541

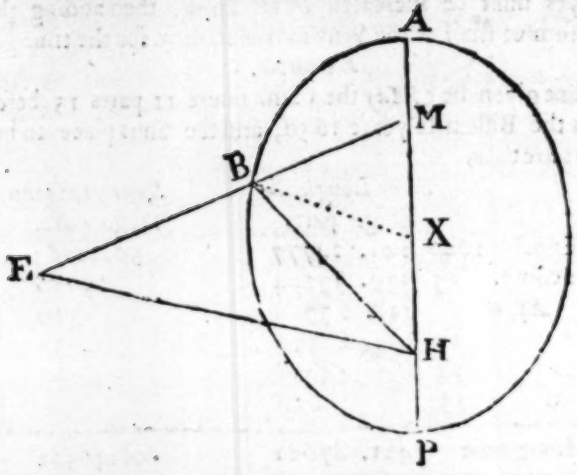
is the angle A M E in the Ellipſis.

And the complement of A M E to a ſemicircle is the angle E M H 145.21459.

The ſide M E	200000		
The ſide M H	3568		
The ſumme	203568	*m. ar.*	4.6912905
Differ.	196432		5.2932822
Tang. $\frac{1}{2}$ ſumme of the oppoſite angles	17.39270		9.4958787
	17.39270		
Tang. $\frac{1}{2}$ Differ	16.81799		9.4803814
Differ	57471 is the angle M E H.		
Difference doubled	1.14942 is the angle M B H		

3 The mean Anomaly being above 180 deg. the Æquation found muſt be added to the ſunsmeane longitude, ſo have you the Suns true place.

Exa:



Example.

The Suns meane longitude		421.67681
Æquation *adde*		1 14942
The Suns true place		422.82623

or 2 Signes 2 degrees 82623 parts of a degree

Lastly, to find his distance from the earth, I say,

As the sine of M B H 1.14942	*co. ar.*	1.6977118
Is to the side M H 3568		3.5524249
So is the sine of B M H 34.78541		9.7562590
To the side B H		5.0063957

or distance required 101483

Thus we have found the Suns place by calculation, we will now shew how to reduce the Suns mean longitude to his true, by the Table of Æquations of the Suns excentriek.

The Suns Anomaly in this example is 325.21459

The Æquation of 325 is		1.15566
326		1.12648
Difference is		02918
Now then I say if one deg.	*co. ar.*	5.
Give 2918		3.4650853
What shall 21459		4.3316095
The answer is 6 :6		2.7966948

Æqua-

Æquation of 325 deg.	1.15566
Part proportional *ſubt.*	626
Æquation equated	1.14940
The Suns mean longitude	61.67681
Æquation *adde*	1.14940
Suns true place	62.82621

And in like manner the Logarithme of the Suns diſtance from the Earth will be found to be 5.0063633, which being more neceſſary then the diſtance it ſelf, in the calculation of the places of the other planets, we have as moſt convenient placed in the table.

CHAP. 8.

Of the Æquation of Civil Dayes.

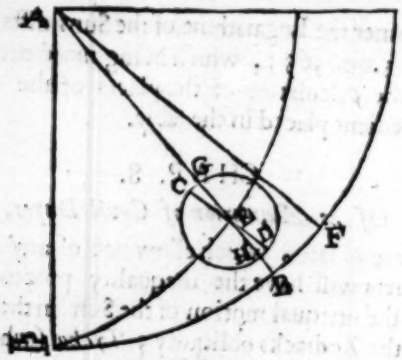
SOme there are of late, which allow not of any Æquation of Civil Dayes, others will have the inequality proceed from two cauſes. Firſt, from the unequal motion of the Sun in the Zodiack, and the other from the Zodiacks obliquity; *Tycho* (whom we ſhall follow in this particular,) doth make the difference between the Suns true longitude and his Right Aſcenſion; to be the abſolute Æquation of naturall dayes, the which is alſo clearly demonſtrated, according to the Copernican Syſteme by *Thomas Street* in his Ephemeris for the yeare 1655; which being but ſhort is here inſerted.

The Æquation of time demonſtrated.

Let A be the center of the Sun, and E of the Earth, ♈ E the earths longitude from the Equinoctiall point in the ecliptick, ♈ F the like arch projected in the Equator, ♈ B the Right Aſcenſion of the Earths or Suns true place, G H is a diameter of the Equinoctiall and Meridian of the earths apparent diurnal revolution, A B the ſemidiameter of the true meridian, and equinoctial ſuppoſed in the heavens; and G H parallel to A B (though here they appeare as one right line. Then let C D parallel to A F be likewiſe a diameter of the Equinoctial and Meridian of the meane or equal diurnal revolution.

Hence C E G the angle of the earths libration, equal to B A F the difference of longitude and Right Aſcenſion is the true Equation of time or the difference between the equal and apparent time. And according to this Demonſtration is our Table (entituled, A perpetual Table for the Equation of time) compoſed. In which you muſt enter with the ſigne and degree of the Suns place either in the uppermoſt and left hand columnes deſcendin

ſcending, or in the lowermoſt and right hand aſcending, and in the common angle is the Equation (according to the titles) to be added or ſubtracted to or from the equal time, that it may be made apparent; But to reduce the apparent to the equal, take the contrary title.



CHAP. 9.

Of the Theory and Motion of the Moon.

THe Moon according to our Hypotheſis is a ſecondary planet, moving about the earth, as the earth and other planets doe about the Sun, and ſo not onely the earth, but the whole Syſteme of the Moone is alſo carryed about the Sun in a yeare, And hence according to *Hypparchus* there ariſeth a twofold, but according to *Tycho* a threefold inequality in the Moons motion. The firſt is periodicall, and is to be obtained, after the ſame manner, as was the excentrique Equation of the Sun or Earth; in order whereunto her middle motions ſhould be firſt ſtated, the which *Bullialdus* by the rules delivered in the fourth and fifth Chapters preceding hath for the Meridian of *Uraniburge* determined to be as followeth.

From the Equinoctiall to the beginning of the Chriſtian Æra, the

Moons middle motion was	135d.	16′	27″
The Meane Anomalie	355	5	18
And the Radix of her latitude	366	29	56

Theſe then we will take for granted, until there be a more exact, and true Geometrical way propounded to us,; onely we will convert them into Decimall numbers, and reduce them to the Meridian of *London*.

From

From the Equinoctial to the beginning of the Christian Æra, The Moons middle motion in decimal numbers at *Vraniburge* was 135.27417

For the Difference of Merid. *adde*	.45750
The Moons mean longitude at *London*	135.73167

The Meane Anomaly.

At *Vraniburge*	355.08833
Differ. Merid. *adde*	.45361
Mean Anomaly at *London*	355.54194

The Radix of Latitude

At *Vraniburge*	366.49889
Differ. Merid. *adde*	.45944
Latitude at *London*	366.95833

The Diurnal Motion of the Moons

	d.
Mean longitude	13.17639
Anomaly	13.06500
Latitude	13.22944

The Annual Motion.

In longitude	129.38389
Anomaly	88.71889
Latitude	148.71278

According to which limitations of the Moones middle motions, we have compoſed our Tables, by help whereof and the Semi-excentricity of the Moons Orbe, which according to *Bullialdus* is 4362 the Moons excentrique equation, or place firſt equated may be found, as before was ſhewed in the Sun. Save onely that here the Moons Anomaly is given without ſubtraction.

Example.

Anno 1587, *Auguſt* 17 ho. 19.41667 in the apparent time, or ho. 19.28973 in the middle time, the Moon being in the meridian of *Vraniburge* noble *Tycho* obſerved her in 26 deg. 38333 of *Gemini* with latitude 5 deg. 23333 S. from which middle time if you ſubtract 83333 for the difference of the meridians of *London* and *Vraniburge*, the time in our meridian is, ho. 18.45640.

And the Suns true place 154.07347.

The Suns diſtance from the Earth 100895.

The Logarithme of that diſtance 5.0038707

The Moons middle motions for the ſame time are as here you ſee them.

Time given	☾ Longitud	☾ Anomaly	☾ Latitude
Years 1500	072.88194	313.06916	017.17805
80	174.24805	158.80139	281.61167
6	069.48028	185.37750	185.50583
July	273.39555	249.77639	284.61194
Dayes 16	310.81222	209.03972	211.66944
Houres 18	9.88222	9.79861	9.92222
Parts 4564	.25051	.24848	.25152
Mean Longitude	810.96077	1126.11125	990.76067
Ded. 2	720.	1080.	720.
There rests	90.96077	46.11125	270.76067

The Moones meane Anomaly 46.11125 is the angle A M E in the preceding Ellipsis, or the summe of the angles M E H and M H E. Therefore in the triangle M E H we have given, 1. The side ME 200000. 2. The side M H 8724. 3. The angle E M H the complements of the Moones Anomaly, to find M E H, whose double, is the excentrique Equation M B H. I say then,

As the summe of M E and M H	208724	co. ar.	4.6804276
Is to their difference	191276		5.2816605
So is the tang. half summe of the opposite angles,	23.05562		9.6290228
To the tang half diff.	21.30786		9.5911109

Differ. 1.74776 is the angle M E H
Differ. doubled 3.49552 is the angle M B H or the equation sought which being subtracted from the Moons mean longitude, because the Anomaly is lesse then a semicircle you shall have the Moones place first equated.

Example.

The Moones meane longitude	90.96077
Equation subtract	3.49552
The Moones place first equated	87.46525

And to find her distance from the Umbilique point at H.

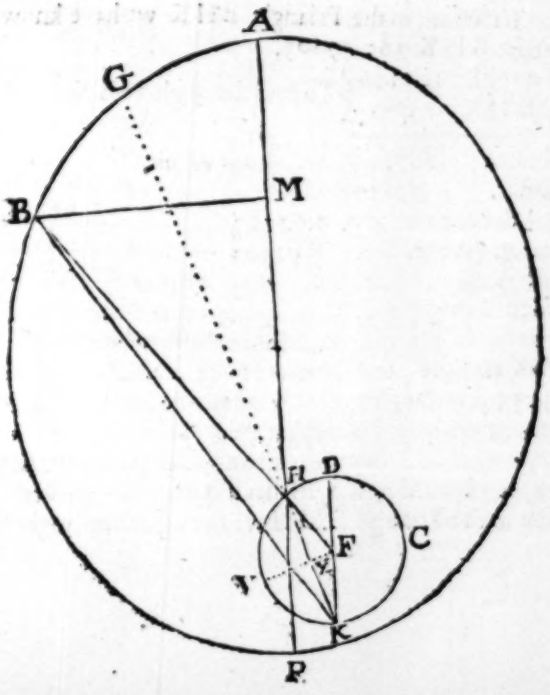
As the sine of M B H	3.49552	co. ar.	1.2148808
Is to the side M H	8724		3.9407156
So is the Sine of B M H	46.11125		9.8577468
To the side B H	103120		5.0133432

But

But whileſt the Moone is thus making her owne periodicall revolution, her whole Syſteme is by the motion of the Earth removed from the proper ſeats thereof, whence there ariſeth another revolution which is called Synodicall, the beginning whereof is the line which paſſeth through the center of the earth to the Sun, and therefore the Moone in that line is void of this ſecond inequality, which is both at the Conjunction and oppoſition, but being in or about her quarters, where ſhe is fartheſt removed from the ſaid Zyzigiacal line the angle of her evection is 2 deg. 50′ as is cleerely proved by the obſervations of *Tycho* and *Bullialdus*, whoſe method we follow, in our calculation of this inequality of the Moon, making 4362 the ſine of the greateſt evection to be the Diameter KD in the little circle KCDH. The motion of this libration of the Moone muſt be meaſured by her double diſtance from the Sun, becauſe ſhe is void of this inequality at her conjunctions and oppoſitions as was ſaid before.

Now then let the angle MHB repreſent the Moones equated Anomaly, found by ſubtracting the former Equation from the ſimple Anomaly, which is 46.11125

Æquation ſubtract	3.49552
Æquated Anomaly	42.61573



And if from the place of the moon first equated 87.46525
You subtract the Suns true place 154.07347
Their distance is 293.39178
The double distance 226.78356
is the arch K C D H and drawing the lines F H and H K there shall be made the equicrurall Triangle H F K, whose exteriour angle H F D is known, viz. the excesse of the Sun and Moons double distance above a semicircle 46.78356. The halfe whereof is the angle D K H 23.39178, equal to the angle A H G, which being subtracted from the Equated Anomaly A H B 42.61573. The angle G H B or the Synodical Anomaly will be 19.22395, whose complement to a semicircle is the angle B H K 160.77605. The side H B 103120 as before, and the side H K may be found in this manner. The arch H V K is the complement of the double distance of the Sun and Moon to a whole circle 133.21644 the subtense of this arch is H K, H V the halfe arch is 66.60822, and H X is the right sine thereof.

Now then, As the Radius,
Is to the Diameter K D 4:62. 3.6396857
So is the sine of H V or H X 66.60822 9.9627533
To the Subtense H K 4003 3.6024390

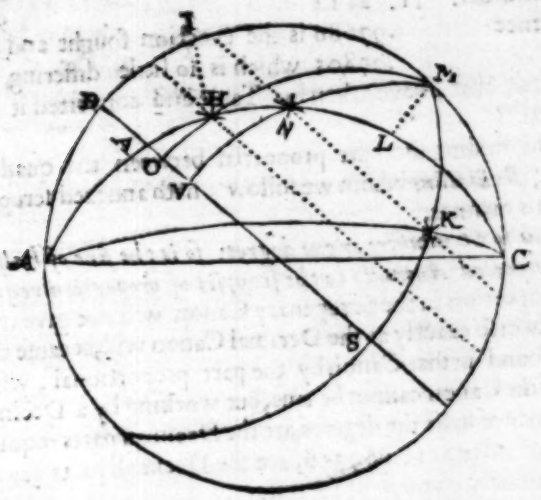
Therefore in the Triangle B H K we have known,
1. The angle B H K 160.77605.
2. The side H B 103120 } To find the angle H B K.
3. The side H K 4003 }

As the summe	107123	co. ar.	4.9701173
To the differ.	99117		4.9961481
So tang. ½ the opposite ang.	9.61197		9.2287638
To the tang. ½ differ.	8.90502		9.1950292

Their difference 0.70695 is the angle of the evection, H B K to be added if the Synodicall Anomaly be more then 180, and to be subtracted from the place of the Moone first equated when lesse, as here it is in our example, and therefore to be subtracted from the Moons place 87 46525, and then her place secondly equated will be 86.75830.

And according to this Analogie may be made a table of the Moons evection, when she is in quadrature or 90 degrees distant from the Sun; for then the equated and Synodicall Anomalies are both the same, and therefore in the Triangle E M H we have give the angle E H M, or the equated

quated Anomaly which suppose 25 degrees, the side M H 8724 and the side H E .208000, to find the angle at E.



As the sum of H E and M H	208724		co. ar.	4.6804276
Is to their difference	191276			5.2816605
So is the tang. half summe				10.6542447
To tang. half differ.	76.40435			10.6163328
Their differ.	1.09565	is the angle	∠M E H	
Whose double is	2.19130		∠M B H	
Then as the sine of M B H	2.1913		co. ar.	1.4175273
To the sine of B M H	27.1913			9.6598808
So is the side M H	.8724			3.9407156
To the side B H	10.4161			5.0181235

or the Moons distance from the umbilique.

Hence in the first Diagram of this Chapter, in the Triangle B H K we have given A H B the equated Anomaly, 25 degrees, the Moons distance H B 10.4161, with the side H K, or rather D K, the Diameter of the little circle 4362,10 find the angle H B K.

As

As the summe of H B and H K 108523		4.9644782
To their difference 99799		4.9991262
So is tang. halfe summe 12.50		9.3447552
To tang. halfe differ. 11.52314		9.3093596

whose difference .97686 is the evection sought and by *Bullialdus* .97805 which is so little differing from what we have found, that I have taken his Table and converted it into Decimall numbers.

And for the finding the part proportial between the quadrature and the Zyzygia, *Bullialdus* whom we follow, hath annexed scruples of proportion in this manner.

As Radius to 60 minutes or one degree; so is the sine of halfe the degrees of the equated Anomaly to the scruples of proportion required.

But this proportion in the Sexagenary Canon will not give the scruples either so easily or so exactly as the Decimal Canon will, because the seconds must still be found in that Canon by the part proportional, which in the beginning of the Canon cannot be true, but working by a Decimal Canon the natural sines of halfe the degrees, are the Decimall parts required, as the naturall sine of 4 degrees; 069756, are the Decimall parts for 8 degrees of equated anomaly, and so of the rest.

Having done with the first and second inequalities of the Moon, we come to the third which *Tycho* calls the variation, *Bullialdus* the Reflection for as the Moons Systeme is carryed about by the earth, the place of her Apogæon is changed, or doth reflect contrary to the succession of the Signes, by reason of which reflection the angle of her Evection is sometimes more sometimes lesse then it will be found by the former directions, but the quantity of this variation according to *Tycho* doth never exceed 40′ 30″ or in Decimal numbers 67500, to be added to or subtracted from the place of the Moone secondly equated, and the proportion by which he finds it is thus,

As the Radius

To the sine of the complement of the double distance of the Sun and Moon if lesse then a Semicircle: To the excesse if more:

So is the sine of the greatest variation, or Reflection.

To the variation required, which is to be added to the Moons place, secondly, equated if the double distance be lesse then 180 deg. to be subtracted, when it is more.

There-

Therefore in our Example,

As the Radius	
To the ſine of H F D 46.78356	9.8625917
So is the ſine of 67500	8.0711591
To the variation 49189	7.9337508
The Moones place ſecondly equated	86.75830
Variation ſubtract	49189
The Moones place in her Orbe	86.26641

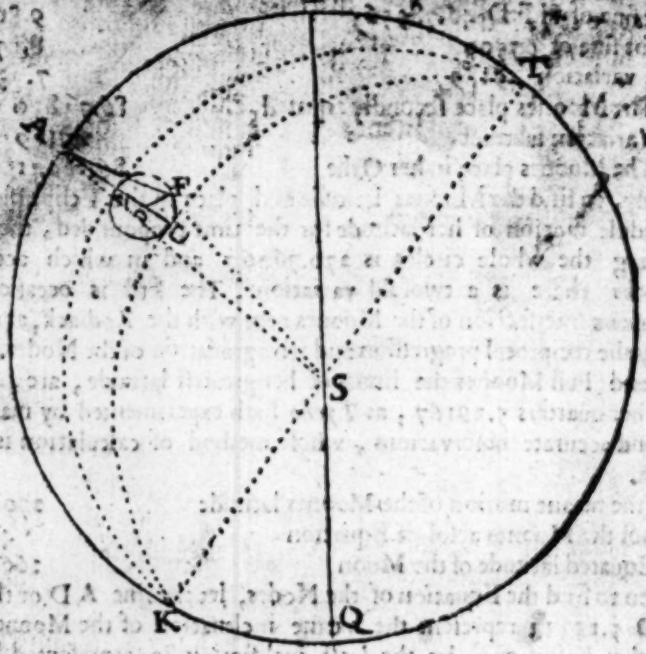
Laſtly, to find the Moones latitude and place in the Ecliptique, take the middle motion of her latitude for the time propounded, the which rejecting the whole circles is 270.76067 and in which according to *Tycho* there is a twofold variation, The firſt is occaſioned by the various interſection of the Moones orbe with the Zodiack, and the other by the reciprocal progreſſion and retrogradation of the Nodes. In the New and Full Moones the limits of her greateſt latitude, are 4.97500, but in her quarters 5.29167, as *Tycho* hath experimented by many diligent and accurate obſervations, whoſe method of calculation is as followeth.

From the meane motion of the Moones latitude	270.76067
Subtract the Moones abſolute Equation	4.694 6
The Equated latitude of the Moon	266.06631

Then to find the Equation of the Nodes, let the line A D or the angle A T D 5.13333 repreſent the meane inclination of the Moones Orbe with the Ecliptique, let the leaſt inclination be repreſented by A B 4.97500, and the greateſt by A C 5.29166. And from the diſtance of the Sun and Moon before found,

	293.39178
Subtract the evection and variation	1.19884
True diſtance of the Sun and Moon	292.19294
The double thereof is	224.38588

which being numbred from B by C to F in the Triangle F D A we have known A D 5.13333 the meane inclination of the Moones Orbe. 2. D F 15833 the halfe difference of the leaſt and greateſt inclination. 3. With the angle F D A 135.61412, the complement of the double diſtance of the Sun and Moon to a whole circle: whence to find the angle F A D the Æquation of the Nodes, by the Doctrine of ſpherical Triangles ſay,



First, As the Radius			
To the cosine of F D C	44.38588		9.8540905
So is the tang. of D F	15833		7.4413175
To the tang of D C	11321		7.2954080
Adde the arch A D	5.13333		
Summe is A C	5.24654		
2 As sine D C	11321	co. ar.	2.7046002
To the sine A C	5.24654		8.9611430
So cotang. F D C	44.38588		10.0093107
To cotang. F A D	1.21062		11.6750539
From the Moones latitude equated		266.06787	
Equation Nodes subtract		1.21062	
True motion of the Moones latitude		264.85725	
whose complement to a whole circle		95.14275	

And

of the Sun and Moone
I deduct the Moones [illegible] d. 5
the little circle, from B by C to F, from the Arch B C F G 270, there re-
maines F G 45.61412, and then the Analogie is,

As the Radius D C		[illegible]
To the sine of F G or D F	45.61412	9.8540595
So is the sine of the arch D C	.15833	7.2013159
To the sine of the arch D E	.11319	7.0553564
The aggregate is B E	.27152	which being added to the least

angle of inclination A T B, or the arch A B 4.97500 the present inclina-
tion is A F or the angle A T F 5.24652.

Hence to find the Moones true latitude, I say,

As Radius		10.0000000
To the sine of A T F	5.24652	8.9611413
So is the sine of A T	84.85725	9.9982481
To the sine of A F	5.22533	8.9593894

or the angle A S F.

And by these Analogies may be made the Table of the Moons latitude wch we have borrowed of *Tycho*, converting it onely into Decimall numbers.) For supposing the Moon to be in her Syzygial points, the angle of Inclination is alwayes A T B 4.975, and then her latitude for every degree of her true motion of latitude may be found by the last Analogie,

Example.

As Radius		10.0000000
To the sine of A T B	4.975	8.9381242
So is the sine of A T	45.	9.8494850
To the sine of A B	3.51564	8.7876092

And her latitude when she is in Quadrature or 90 degrees distant from the Sun may be found by the same analogie, if you make the angle of Inclination A T C 5.29166.

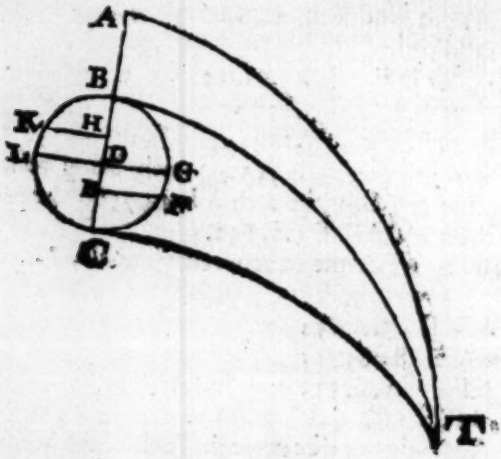
Example.

As Radius		10.0000000
To the sine of A T C	5.29166	8.9648317
So is the sine of A T	45.	9.8494850
To the sine of A F	3.73910	8.8143367
Subtract A B	3.51564	there rests the Excesse to be placed in
the Table	0.22346.	

The proportipnal part of which excesse to be added to the Moones la-

titude

itude must be found by scruples of proportion, and the Scruples themselves for every degree of the Moones distance from the Sunne may thus be had.



As Radius
To the Cosine of the Moones double distance D H 40 . 9.8842539
So is the sine of D B 0.15833 7.4413575
To the sine of D H 0.12142 7.3256114
Their differ. is B H 0.03691
Then as the Diameter B C 31666 5.4994068
Is to the Diameter B C 100,000 5.0000000
So is B H 0.03691 3.5671440
To B H 0,11656 4.0665508

Or more readily thus D H 76604 is the sine of 50 or the Cosine of 40 the Moones double distance from the Sun, which being deducted from Radius, the remainder is the versed sine B H 23396 the halfe 11698, are the scruples of proportion answering to 20 deg. of the Moones single distance from the Sun,

From the Moones place in her Orbe 86.26641
Subtract the Moones true latitude 264.85725
The Moones Node ascending 181.40916

Lastly, for her Reduction,

As

As Radius
To the Cosine of A T F 5.24775 9.9981757
So tang. of A T 84.85725 11.0458587
To tang. of T F 84.83689 11.0440344
Difference 02036 is the Reduction sought
From the place in her Orbe 86.26641
Subtract her Reduction .02036
The Moones place in the Ecliptique 86.24605

CHAP. 10.

To calculate the true Motion of the Moon by Tables.

HAving gathered the meane motions of the Moones Longitude, Anomaly, and argument of Latitude, as in the last Chapter, by the Anomaly find the Moones Eccentrick equation, and by that her Eccentrick place.

2 Apply her eccentrick Equation according to the title both to the meane Anomaly, and to the motion or argument of Latitude; So have you the equated Anomaly and motion of Latitude, first equated.

Example.

Anno 1587, *August* 17 ho. 18.45640 the Moons meane Longitude was before found to be 90.96077
Her meane Anomaly 46.11125
Her motion of Latitude 270.76067

Her Eccentrick equation to	47 deg.	3.54892	
	46 deg.	3.48880	
Differ.		0.06012	
Now then as 1 deg.			5.0000000
Is 10 06012			3.7790190
So is 11125			4.0463000
To 00668			2.8253190
To the Equation of 46 deg.			3.48880
Adde the part proportionall			668
The Moones eccentrick Equation			3.49548

which being subtracted from her meane Longitude, Anomaly and Latitude.

Her place first equated is 87.46529
Her equated Anomaly 42.61577
Her Latitude first Equated 267.26519

degree from her mediaque.

The Logarithme to	46 Deg. 15	5.0133649
	47 Deg. 15	5.0131474
	Differ.	2175
As if one Degree		5.0000000
Is to 2175		3.3374592
So is 11125.		4.0463000
To 241		2.837592
Which being deducted from		5.0133649
The Moones Logarithme is		5.0133408

4 Subtract the true place of the Sun, from the Moones eccentrick place, so have you the distance of the luminaries, with the double whereof seeke in the Table the eccentricity of the Moones evection, and the quantity of her variation or reflection, using the part proportional if need require.

5 If the double distance of the luminaries with which you enter the Table be lesse then a semicircle, adde halfe the complement thereof unto the equated Anomaly, or if it be more then a semicircle, deduct halfe the excesse above a semicircle from the equated Anomaly, then the summe or difference if lesse then a Semicircle, is the summe of the opposite angles, or if it be more, take the complement, to a whole circle.

Example.

	☉ *Longitude*	☉ *Apogæon*
Years 1500	290.20076	94.01167
80	.59826	1.26342
6	359.55205	.09473
July	208.95710	917
Dayes 16	15.77035	69
Houres 18	.73933	
Parts 4564	.01874	
Suns Longitude	875.83649	95.37968
Apogæon subtract	095.37968	
Mean Anomaly	060.45681	

the

The Suns eccentrick to	61 deg.	2.77[illegible]
	60 deg.	1.75464
Difference		1790
As one degree		5.0000000
Is to 1790		3.2528530
So is 45681		4.6597156
To 817		2.9125886
The equation to 60 deg.		1.75464
Adde the part proportionall		817
The absolute Equation *subtract*		1.76181
From the Suns meane longitude		155.83649
The Suns true place *subtract*		154.07368
From the Moones eccentrick place		87.46329
The distance of the Sun and Moon		293.42161
The double distance		226.78322
The Logarithme of the Eccentrick to	226 deg.	3.6037118
	227 deg.	3.6020834
Difference		16284
As one degree		5.
Is to 16284		4.21176 10
So is 78322		4.8938837
To 12753		4.1056447
which being subtracted from		3.6037118
The Logarithme of the Eccentricity is		3.6024365

Thus we have found the Logarithms of the two lateral distances, namely of the distance of the Moon from her Umbilique 5.0133408 and of the Eccentricity of her Evection 3.6024365. And because the double distance of the Sun and Moone is more then a semicircle 226.78322

Deduct 180 there rests	46.78322
The halfe whereof	23 39161
Deduct from the equated Anomaly	42.61577
There resteth the Synodical Anomaly	19.22416

or summe of the opposite angles. Hence to find the Evection,

Say, As the greater Logarithme [illegible]	4.9866502
Is to the lesser	3.6024365
So is Radius	10.0000000
To the tang. of 2 deg. 22494	8.5890.367
Adde 45	

2 Ope-

2 *Operation.*

As Radius		10.0000000
To the Cotang.	47.22494	9.9662367
So tang. half ſum	9.51208	9.2287955
To the tang. half dif.	8.90555	9.1950324
Evection	0.70653.	

Subtract becauſe the Synodical anomaly is leſſe then 180.

Then for the variation, I enter the Table with the Moones double diſtance 226.78322; and uſing the part proportional I find it to be 0.49186 ſubtract.

The Evection to be ſubtracted is	0.70653
The Variation to be ſubtracted is	.49186
Their ſumme	1.19839
Subtract from the Moons Eccentrick place	87.46529
There reſts the Moones place in her Orbe	86.26690

Otherwiſe thus.

Enter the Table entituled *Bullialdus* his Table of Evections, with the Synodical Anomaly 19.22416, and uſing the part proportional you ſhall find it to be 75942, ſubtract, then take from thence with the Moones double diſtance 226.78322 the ſcruples of proportion alſo, the which obſerving the part proportional are; 91781, by which the Evection found is thus to be corrected. As 1 degree is to 75942: ſo is 91781 to the Evection ſought 69701 ſubtract, and this ſubtracted according to the title from the Moones Eccentrick place 87.46529

There reſts her place ſecondly equated 86.75828

Then for the variation enter this or the former table with the Moons double diſtance 226.78322, and uſing the part proportional you ſhall find it to be 49186 as before, with the title Subtract; and therefore the Moons place in her Orbe 86.26742, but little differing from the former.

And from theſe two Tables of Evection & Variation, we have compoſed a third Table, entituled a compounded Table of the Moones ſecond and third inequalities, for the yet more ſpeedy finding of theſe equations, whoſe conſtruction is thus.

Firſt, enter the Table of the Moones Evection with her Synodicall Anomaly to find the Evection, and with her double diſtance from the Sun to find the Scruples of proportion.

The Moones double diſtance may be ſuppoſed, and the Synodicall anomaly eaſily made from it: as ſuppoſe the Moones diſtance from the Sun to be

be 3 degrees thereof to a quadrant 87 being added to the equated Anomaly which you may alſo ſuppoſe to be what you pleaſe, will give the ſynodical Anomaly, thus if the equated Anomaly be 25, adde 87 thereto, and then the ſynodical Anomaly will be 112 and the angle of evection anſwering thereto 2.38861 ſubtract: and the ſcruples of proportion anſwering to 6 degrees 52335. Hence to finde the true evection. I ſay,

As 1 degree	1.00000	0.0000000
Is to the evection in the table	2.38861	0.3781452
So are the ſcruples of prop.	0.52335	1.7187922
To the evection ſought, *Sub.*	0.12500	0.0969374
The variation to 6 deg. *adde*	0.07055	

And becauſe the evection and variation are of different titles therefore there difference 05445 is the compounded equation ſought, which I place againſt 25 degrees of equated Anomaly in the columne of 3 deg. of the Moons diſtance from the Sun, with the title *ſubtract*, becauſe the title of the biggeſt number was *ſubtract*.

And therefore the ſecond and the third inequalities of the Moone are to be found in this table by entering it with the Moones diſtance from the Sun in the head or foot of the table, and with the equated Anomaly in the ſides, for ſo the common angle uſing the part proportional, if need require, will give the Equation ſought to be applyed to the Moons place according to the title.

Example.

Suppoſe the diſtance of the Sun and Moone were 293.39161, that is, deducting a Semicircle 113.39161, and her equated Anomaly 42.61577 becauſe the Moones diſtance from the Sun is found in the bottome of the table, I number the equated Anomaly in the firſt columne towards the right hand aſcending, and in the common angle (by making proportion for the intercepted degrees) I finde the Equation to be 1,188 S. that is the title ſubtract, and therefore this Equation being ſubtracted from the Moones Eccentrick place, what remaineth ſhall be the Moones place in her orbe.

CHAP. 11.

To finde the Moones true Latitude and place in the Ecliptick.

TO the motion of Latitude firſt Equated, according to the title apply the agregate of the Moones ſecond and third Equations, ſo have you the motion of Latitude ſecondly equated,

2. To the distance of the Sun and Moon before found apply the aggregate of the Moons 2 d. and 3 d. Equations according to the title, so have you the true distance of the Sun and Moone.

Example.

Motion of Latitude first equated	267.26519
Second and third equations sub.	1.19839
Motion of Latitude secondly equated	266.06680
Distance of the Sun and Moone as before	293.39161
Second and third Equation sub.	1.19839
True distance of the Sun and Moone	292.19322

3. With the true distance of the Sun and Moon enter the table of the Equation of the Nodes, and take thence the Equation of the Nodes, which according to the title, apply to the motion of Latitude secondly Equated, and you have the true and absolute motion of Latitude. At the same entrance take out also the scruples of proportion and reserve them.

Example.

With the true distance of the Sun and Moone	292.19322
I finde the Equation of the Nodes, subt.	1.21103
From the Latitude secondly Equated	266.06680
So the true motion of Latitude	264.85577
And the scruples of proportion	85729

4. With the true motion of Latitude enter the table of Latitude, and thence take the Latitude and the excesse, then say, as one degree to the excesse in the table: so are the scruples of proportion before reserved, to the excess sought, which being added to the Latitude found by the table, the summe shall be the true Latitude of the Moone, which is North when the true motion of Latitude is lesse then 6 signes, and South when it is more.

Example.

The true motion of Latitude		264.85577
Gives { The Latitude		4.95490
{ The Excess		31519
As one degree	1.00000	
To the excess in the table	31519	1.4985724
So the scruples of propor.	85729	1.9331277
To the excess desired	27020	1.4317001
Which being added to the Latitude		4.95490
It gives the true Latitude. South		5.22510

5. If

5. If the true motion of Latitude be ſubtracted from the Moones true place in her orbe, there reſteth the Node Aſcendant.

As {	The Moones true place	86.26690
	The Motion of Latitude ſubt.	264.85577
The Node aſcendant		181.41113

6. With the true motion of Latitude enter the table of Reduction, and take out the Reduction, which according to the title apply to the Moones place in her orbe, you have her true place in the Ecliptick.

Example.

The true motion of Latitude	264.85577
Gives the reduction to be ſubt.	02067
From the Moones place in her Orbe	86.26690
The Moons place in the Ecliptick	86.24623

CHAP. 12.

Of the motion of the fixed Starres.

THe motions of the fixed Stars are by the obſervations of all ages found to be equall, and the quantity of that equal motion, Noble *Tycho* by comparing his owne obſervations with thoſe of the ancients hath determined to be exact 51 ſeconds, *Bullialdus* 50″ 55‴ *ferè*, and the place of the firſt Star in Aries in the yeare of our Lord 1600 compleat to be 27 deg. 37 min. which being converted into Decimalls the Radix of the middle motions of the fixed Stars at that time will be 27.61667 and the yearely motion. 01414, that is the decimall of 50 ſeconds 55 thirds.

Hence to finde their places at any time aſſigned, we have exhibited a table of the longitudes and latitudes of ſome of the moſt notable fixed Stars for the yeare 1650 compleat, which by the motions of the fixed ſtars in the tables of the Suns meane motions, may thus be done for any other time. Take the difference betweene the time given and 1650 compleat, and the motion agreeing to that difference, this motion ſubtract from the place in the table when the time given is before 1650, or elſe adde it, and you have the place deſired. The Latitudes and Magnitudes are ſtill the ſame.

Example.

The time given 1683 *September.*	
Difference from 1650 compl.	33 yeare 8 Moneths
Motion Correſpondent	.476.8
Place of *Oculus* ♉ 1650 compl.	♊ 4.91667
Place required	♊ 5.39305
Latitude South	5.51667

CHAP. 13.

Of the Motion of Saturne.

OUr Tables of *Saturns* meane motions as of the other Planets, are he ſame with thoſe of *Bullialdus*, being onely reduced to the Meridian of *London*, and converted into Decimall numbers whoſe eccentrick being ſo eaſie to be found, and the inveſtigation of his true place, with the places of *Jupiter*, *Mars*, *Venus* and *Mercury*, being out of curioſity, rather then uſe, we ſhall content our ſelves with the Trigonometricall calculation onely, firſt, of *Saturne* for the time before given 1587. *Auguſt* 17: h: 18: 4564: and then of the reſt.

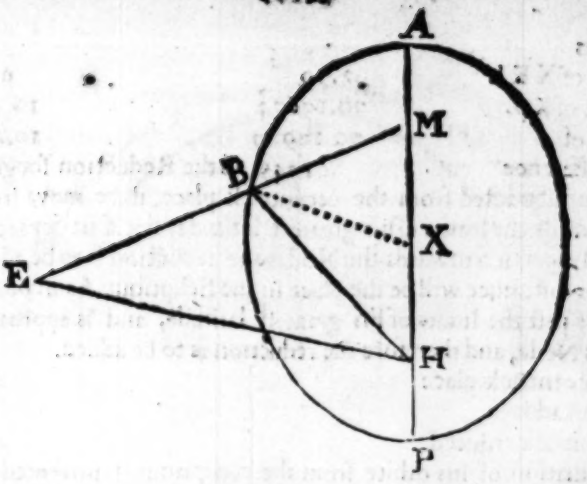
An. Chriſt.	*Longit.* ♄	*Aphel.* ♄	*Node* ♄
1500	064.98279	262.82583	109.79361
80	258.76528	2.53694	0.57611
6	73.39056	.19078	0.04306
July	7.10111	.01833	.00444
D. 16	.53183	.00139	.00039
H 18	.02500		
P. 4564	.00063		

Meane Mot. 404.80120 265.57327 10.41752

Aphel. Subt. 265.57327 *Reſts Anomaly* 139.22793

The halfe of *Saturns* firſt inequality, or his eccentricity ſuppoſing the Semidiameter of *Saturns* orbe to be 100.000. is 5774. and the Semidiameter of the Earths orbe 10480. As they are computed by *Bullialdus*, but the Semidiameter of the Earths orbe being before ſuppoſed to be 100.000 the Semidiameter of *Saturns* orbe will be 954198, for as 10480 is to 100.000. So is 100.000. to 954198. and *Saturns* eccentricity in the ſame parts will be 55145. for as 100.000 is to 954198. So is 5774 to 55145. whoſe double 110200 is the ſide M H in the figure following; in the triangle therefore M E H, we have knowne, 1. The Angle H M E 40.77207, the complement of *Saturns* Anomaly to a ſemicircle 139.22793 or the halfe ſum of the angles M E H and M H E *viz.* halfe the anomaly 69.61396.

2. The ſide M E 1908396 } To finde the Angle M E H.
3. The ſide M H 110290 }



As ther: ſum	2018686	co.ar.	3.6949313
Is to their differ.	1798106		6.2548153
So is tang. halfe ſum	69.61396		10.4299016
To tang. halfe diff.	67.35375		10.3796482
Difference	2.26021	is the angle M E *H.*	
Difference doubled	4.52042	is the angle M B H, or the Equation ſought, to be ſubtracted from *Saturns* meane Longitude, the Anomaly being leſſe then a ſemicircle.	
Saturns meane Longitude			44.80120
Equation Subt.			4.52042
Saturns eccentrick place			40.28078

2. *To finde his diſtance from the Sun.*

As the ſine M B H	4.52042	co.ar.	1.1034042
Is to the ſide M H.	110290		5.0425361
So ſine E M H	40.77207		9.8149473
To the ſide B H	913876		5.9608876

3. From the eccentrick place of *Saturne* ſubduct the Node, there reſteth the argument of Latitude: by help whereof and the angle of his greateſt inclination, which according to *Bullialdus* is 2 d. 50, or 4362, we may eaſily finde his Reduction, but the ſide E B 4362 in the parts of 100.000, muſt be reduced into the parts of *Saturns* ſemidiameter 954198, to finde the curtation. As 100.000 is to 954198, ſo is 4362 to 41622.

Saturns eccentrick place	*Example.*	49.28078
Node ſubſtract		110.41752
Argument of Latitude		289.86326
Whoſe complement is K L		70.13674

As

As Radius
To cosine of X K L 2.50 9.999586
So is tang. of K L 70.13674 10.4421682
To tang. of 70.12929 10.4417546
Whole difference .01745 is the Reduction sought:

And to be subtracted from the eccentrick place, if he move from either Node towards the limits of his greatest latitude, but if he depart from the limits and approach towards the Nodes the reduction is to be added, for so the sum or difference will be the place in the Ecliptique. As in our example, *Saturne* is past the limits of his greatest latitude, and is approaching towards his Node, and therefore the reduction is to be added.

Saturns eccentrick place 40.28078
Reduction adde .01745
The eccentrick reduced 40.29823

The inclination of his orbite from the ecliptique represented in the second figure following by the line X L, may thus be found.

As the Radius K E 90.
To the greatest inclination E B 41622 4.6193229
So is the sine of K L 70.13674 9.9733616
To the side X L 39145 4.5926845

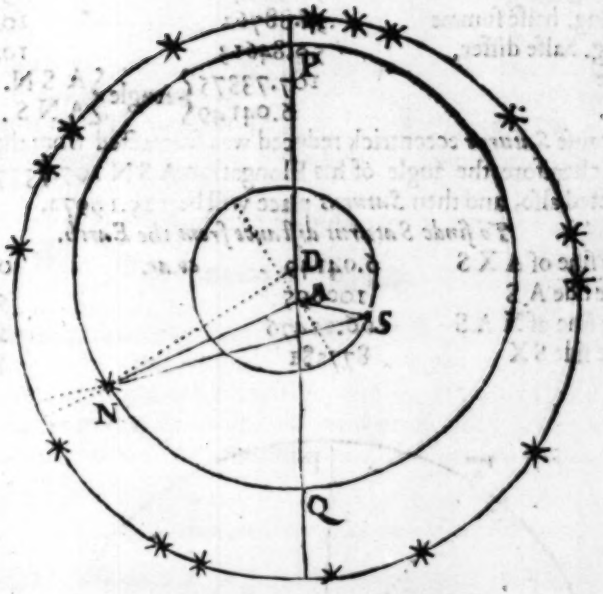
which is the inclination agreeing to the common Radius 954198, whereas the distance of *Saturne* from the sun is to be put for the Radius, and then X L will be but 37491.

As D L 954198 *co.ar.* 4.0203616
To A L 913876 5.9608876
So is X L 39145 4.5926845
To X L 37491 4.5739336

The distance of *Saturne* in his orbite from the Sun being given with the inclination of his orbite from the ecliptique, the distance corrected by curtation may thus be found.

As A L 913876 *co.ar.* 4.0391124
Is to Radius 90 10.0000000
So is L X 37491 4.5739336
To the tang. of L A X 2.35121 8.6130460
As Radius
To A L 913876 5.9608876
So cosine of L A X 2.35121 9.9996343
To A X 913107 5.9605219

To



To finde Saturns second inequality.

Subtract the suns place from the Eccentrick reduced, or this from it, so that lesse then 180 degrees may remain, this remainer is the Anomaly of the orbe, the complement whereof is the angle N A S, or the halfe, is the halfe sum of the opposite angles.

Example,

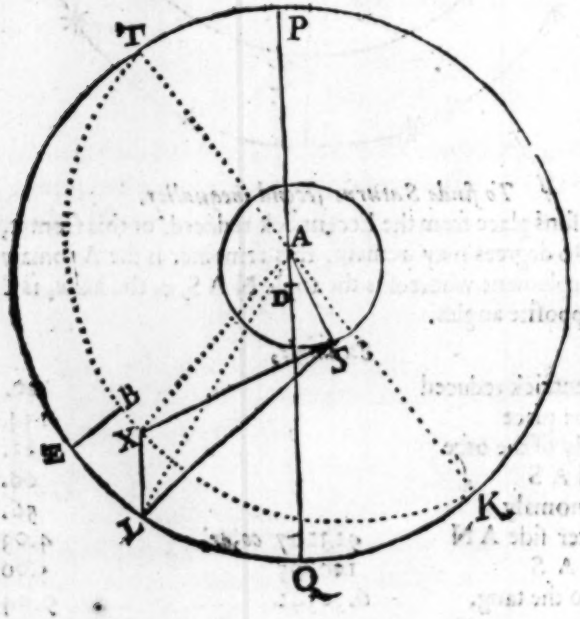
Saturns Eccentrick reduced		40.29823
The Suns true place		154.07347
The Anomaly of the orbe		113.77524
The angle N A S		66.22476
The halfe Anomaly		56.88762
As the greater side A N	913107 co.ar.	4.039478
Is to the lesse A S	100895	5.003870
So Radius, to the tang.	6.30541	9.043348
Adde	45.	

As Radius			
To cotang. of the ſumme	51.30541		9.9036304
So is tang. halfe ſumme	56.88762		10.1856192
To tang. halfe differ.	50.84613		10.0892496
Summe	107.73375	Angle A S N.	
Differ.	6.04149	Angle A N S.	

Becauſe *Saturne* eccentrick reduced was ſubtracted from the Suns true place, therefore the angle of his Elongation A S N 107.73375 muſt be ſubtracted alſo, and then *Saturns* place will be 125.19972.

To finde Saturns diſtance from the Earth.

As the ſine of A X S	6.04149	co.ar.	0.9777838
To the ſide A S	100895		5.0038707
So the ſine of X A S	66.12476		9.9614845
To the ſide S X	877281		5.9431390



To

To find the latitude of ♄ from the earth.

As S X. 877291	*Co. ar.*	4. 056861o
Is to Radius		10. 0000000
So is X L, 37491		4. 5739336
To the tang. of X S L, 2. 44711.		8. 6307946

which is the quantity of ♄ Southern Latitude, becauſe the argument of Latitude was more then 6 ſignes, when it is leſs then 6 ſigns, the Latitude is North.

CHAP. 14.

Of the Motion of Jupiter.

THe inveſtigation of the place of this and the other Planets, is well nigh the ſame with that of ♄, they differ more in the Dimenſions of their Orbs, then in the manner of their calculation. Yet that there may be no miſtake, we will not onely give you the Dimenſions of their ſeveral orbs, but makes examples of their calculation to the former time given.

The meane motions of Jupiter.

Anno Chriſti.	*Longitude* ♃	*Aphelion* ♃	*Node* ♃
Years 1500	004.50000	185.54833	097.93889
80	269.04444	1.98000	.54722
6	182.13667	.14833	.04111
July	17.62333	.01444	.00389
Dayes 16	1.33000	.00104	.00030
Houres 18	.06222		
Parts 4564	.00154		
Mean motion.	474.69820	187.68414	98.53141
Aphelion ſubt.	187.68414	*Reſts Anomaly*	287.01406

The halfe of *Jupiter* firſt inequality, or his eccentricity, ſuppoſing his Semidiameter to be 100.000 by the computation of *Bullialdus* is 4856, and the Semidiameter of the Earths Orbe 19138; and therefore to find ♃ Semidiameter, when the Semidiameter of the Earths Orb is 100.000 the proportion is, As 19138. Is to 100. 000 ſo is 100.000 to 522520, the Semidiameter required, which being doubled is the Diameter of the El-

lipſis, or the ſide M E 1045040. And to find the eccentricity in the ſame parts, ſay, as 100. 000. is to 522580. ſo is 4856, to 25373. the excentricity, and the double thereof. 50746 is M H the diſtance of the foces.

The complement of the Anomaly 72. 98594 is the angle A M E, and the halfe compl: 36. 49297, is the halfe ſum of the oppoſite angles M E H and M H E.

The ſide M E	1045040		
The ſide M H	50746		
Sum	1095786	*co. ar.*	3. 9602744
Differ	994294		5. 9975147
Tang. ½ ſum	36. 49297		9. 8690974
Tang. ½ differ	53. 87162		9. 8268865
Differ.	2. 62135	Angle M E H	
Double differ.	5. 24270	Angle M B H	or the Equatiõ ſought,

and to be added to *Jupiters* mean longitude, the Anomaly being above a Semi-circle.

Jupiters mean longitude	114.69820
Equation add	5.24270
Jupiters eccentrick place	119.94090
The Node ſubt.	98.53141
Argument of Latitude.	21.40949

By help whereof, and the angle of his greateſt inclination 1. 36333, or E B 2379, we may find the reduction: but to find the parts of inclination in proportion to the given Radius 522520. ſay, As 100. 000. is to 2379, ſo is 522520 to 13619. the parts required.

To finde the Reduction.

As Radius			
So Coſine of X K L.	1. 36333		9. 9998770
To tang. of K L.	21.40949		9. 5933823
To tang. of X K.	21. 40353		9. 5932593
Differ.	.00596	*Reduction.*	

Becauſe the argument of Latitude is leſſe then 90. the Reduction muſt be ſubtracted from the eccentrick place.

Jupiters eccentrick place	119. 94090
Reduction ſubt.	.00596
Eccentrick reduced	119. 93494

To

To find the Inclination.

As Radius			
To the greateſt inclin: E B 13619			4.1341452
So is the ſine of K L 21. 40949			9. 5623296
To the ſide X L 4971			3. 6964748

which are the parts of inclination agreeing to the cõmon Radius 522520, but the diſtance of ♃ from the ☉ is to be put for the Radius, the which diſtance may thus be found.

As the ſine of M B H	5. 24270.	*Co. ar.*	1. 0391741
Is to the ſide M H	50746		4. 7054018
So is the ſine of E M H	72. 98594		9. 9805636
To the ſide B H	531055		5. 7251395
As the common Rad: D L	522520	*Co. ar.*	4. 2818971
To *Jupiter* diſt: B H or A L	531055		5. 7251395
So is X L	4971		3. 6964748
To X L	5052		3. 7035114

To finde ♃ diſtance corrected by Curtation.

As A L	531055	*Co. ar.*	4. 2748605
Is to Radius			10. 0000000
So is L X	5052		3. 7035114
To the ſine of L A X	54515		7. 9783719
As the Radius			
To A L	531055		5. 7251395
So is the Coſine of L A X			9. 9999831
To A X	531034		5. 7251226

To finde the ſecond inequality of Jupiter.

We muſt have given, 1. The angle N A S, which is to be found by ſubſtracting the ☉ place from ♃ eccentrick or reduced, or this from it, ſo that leſſe then 6 Signes may remain, this remainer is the Anomaly of the Orbe, and the Complement thereof is the Angle N A S, or the halfe is the halfe ſum of the oppoſite angles.

Example.

Jupiters eccentrick reduced	119. 93494
☉ True place	154. 07347
The Anomaly of the Orbe	34. 13893
The angle N A S	14 .86107
The halfe Anomaly is	17. 06946

Theſe given with the ſides N A and A S, I ſay.

As the greater ſide A N	531034	*co. ar.*	4.2748774
Is to the Radius			10.0000000
So is the leſſer ſide A S	100895		5.0038707
To the tang. of	10.75783		9.2787481
Adde	45		
As Radius to Co-tang.	55.75783		9.8329403
So tang: of ½ ſumme	17.06946		9.4872186
To tang. of ½ differ.	11.80522		9.3201589
Summe	28.874687	Angle A S N	
Differ.	5.26424	Angle A N S	

Becauſe ♄ eccentrick reduced was ſubtracted from the ☉ place, therefore the angle of his Elongation A S N 28.87468 muſt be ſubtracted alſo, and ſo ♄ place 125.19839.

To finde the diſtance of Jupiter *from the Earth.*

As the ſine of A N S	5.26424	*co. ar.*	1.0373985
To the ſide A S	100895		5.0038707
So the ſine of N A S	34.13893		9.7491287
To the ſide S N	603111		5.7803979

To finde the latitude of ♄ from the Earth.

As the ſide S N	603111	*co. ar.*	4.2196021
To the ſide X L	5052		3.7035114
So is the Radius	90		10.0000000
To tang. of X S L	0.47998		7.9231135

Which is the quantity of ♄ Northern latitude.

CHAP. 15.

Of the Motion of Mars.

THere being no other variety in calculating the place of this Planet, then what hath been already ſhewed, in the motions of *Saturn* and *Jupiter*, we will proceed in the ſame method, and gather firſt the middle motions for the former time given, and then ſhew the Dimenſions of his ſeveral Orbs, as we ſhall have occaſion for them.

An. Chriſti.

An. Christ.		Longit. ♂	Aphel. ♂	Node ♂
Yeares	1500	245.61611	146.80916	45.40250
	80	193.32778	1.75139	1.07194
	6	68.23750	.13139	.08028
July		111.10306	.01250	.00778
D	16	8.38500	.00096	.00057
H	18	.39306		
P	4564	.00996		
Mean Mot.		627.07247	148.70540	046.56307
Aphel. Subt.		14[illegible].70540	Rest Anom.	119.36707

Supposing the Semidiameter of ♂ his Orbe	100.000
His eccentricity according to *Bullialdus* is	9239
Semidiameter of the Earths Orbe	656[illegible]8
The sine of his angle of Inclination	3230
And the Arch answering thereto	1.85111
And therefore suppose the R. of the Earths Orbe	100.000
The eccentricity of *Mars* will be	14075
The Semidiameter of his Orbe	152350
The parts of his greatest Inclination	4921

The Anomaly 119.36707 is the angle A M E in the Ellipsis of the 13 Chapter, and therefore the halfe of it is the halfe sum of the angles M E H and M H E 59.68353

2. The side M E	304700		
3. The side M H	28150		
Summe	332850	co.ar.	4.4777515
Differ.	276550		5.4417726
Tang: ½ sum	59.68353		10.2330382
Tang: ½ diff:	54.86290		10.1525633
Difference	4.82063	Angle M E H	
Difference doubled	9.64126	Angle M B H	

or the Æquation sought, and to be subtracted from the planets mean Longitude, because the Anomaly is lesse then 180. *viz.* 119.36707.

Meane longitude of *Mars*	267.07247
Æquation subtracted	9.64126
Mars his Eccentrick place	257.43121

To finde his diſtance from the Sun.

As the ſine of M B H	9.64126	*co.ar.*	0.7760404
To the ſide M H	28150		4.4494783
So is the ſine of M B H	60.63893		9.9402403
To the ſide B H	146473		5.1657590
From the eccentrick place ſub: Node.			119.36707
Argument of Latitude			128.06614
Whoſe complement is K L			51.93586

To finde the Reduction.

As the ſine of 90			
To Coſine the great inclin: X K L	1.85111		9.9997732
So tang: of K L	51.93494		10.1061739
To tang: of X K	51.92039		10.1059471
Differ.	.01455	Reduction.	

Becauſe the argument of Latitude is more then 90, the Reduction muſt be added to the Eccentrick place.

The eccentrick place of *Mars*	257.43121
Reduction adde	.01455
Eccentrick reduced	257.44576

To finde the preſent inclination.

As Radius			
To the greateſt inclin: E B	9921		3.6920533
So the ſine of K L	51.93494		9.8960878
To the X L	3873		3.5881411

Which are the parts of inclination agreeing to the common Radius, 152350. But the diſtance of *Mars* from the ☉ is to be put for the Radius, and then the parts of inclination will be 3724.

For as common Radius D L	152350	*co.ar.*	4.8171576
To ♂ diſtance B H or A L	146473		5.1657590
So is X L	3873		3.5881411
To X L	3724		3.5710577

To finde the diſtance of ♂ corrected by Curtation.

As A L	146473	*co.ar.*	4.8342410
To Radius			10.0000000
So is X L	3724		3.5710577
To the ſine of L A X	1.45703		8.4052987

As

As Radius		
To A L	146473	5.1657556
So Cosine of L A X	1.45703	9.9998596
To A X	146426	5.1656186

To finde the second inequality of Mars.

We must have given, 1 The angle N A S, which is to be found by subducting the ☉ place from the eccentrick of ♂ reduced, or this from it, so that lesse then 6 signes may remain, this remainer is the Anomaly of the Orbe, and the complement thereof is the angle N A S, or the halfe, is the halfe sum of the opposite angles.

Example.

The eccentrick of ♂ reduced			257.44576
The ☉ true place			154.07347
Anomaly of the Orbe			103.37229
Complement is N A S			76.62771
Halfe Anomaly			51.68614

These given with the sides N A & S A, I say,

As the greatest side N A	146426	*co.ar.*	4.8343814
Is to Radius			10.0000000
So is the lesser side S A	100895		5.0038707
To the tang. of	34.56887		9.8382521
Adde	45		
As Radius			
To co-tang.	79.56887		9.2650444
So tang. ½ sum	51.68614		10.1022929
To tang. ½ diff.	13.11536		9.3673373
Summe	64.80150	angle A S N	
Differ.	38.57078	angle A N S	

Because the Suns place was subtracted from the eccentrick of ♂ reduced, therefore the angle of elongation A S N 64.80150 must be added to the ☉ place 154.07347
and then the place of ♂ will be 218.87497

To finde the distance of ♂ from the Earth.

As the sine of A N S	38.57078	*co.ar.*	0.2051762
To the side A S	100895		5.0038707
So sine of N A S	76.62771		9.9880626
To the S N	157438		5.1971102

To

To finde the latitude of Mars *from the Earth.*

As the ſide S X	157438	*co.ar.*	4.8018898
To the ſide X L	3724		3.5710577
So is Radius			10.0000000
To tangent of X S L	0.13560		7.3739475

Which is the quantity of ♂ his Northern latitude.

CHAP. 16.

Of the Motion of Venus.

HAving done with the three ſuperiour Planets, *Saturn*, *Jupiter* and *Mars*, we come to the two inferiour, *Venus* and *Mercury*, the inveſtigation of whoſe places is much after the ſame manner with the former, the difference is in the ſecond inequality, occaſioned by their motion under the earth, the Orbs of the other Planets being above it; that this difference may be the better diſcerned, we have added an example in each for the time before given.

The meane motions of Venus.

An. Chriſt.	*Longit.* ♀	*Aphel.* ♀	*Node* ♀
Yeares 1500	333.11667	303.97639	073.28944
80	15.48472	1.12694	.67028
6	270.36028	.08444	.05028
July	339.65833	.00806	.00500
D 16	25.63472	.00062	.00039
H 18	1.20194		
P 4564	.03048		
Meane Mot.	265.48714	305.19645	074.01537
Aphel. Subt.	305.19645	*Reſt Anom.*	320.29069

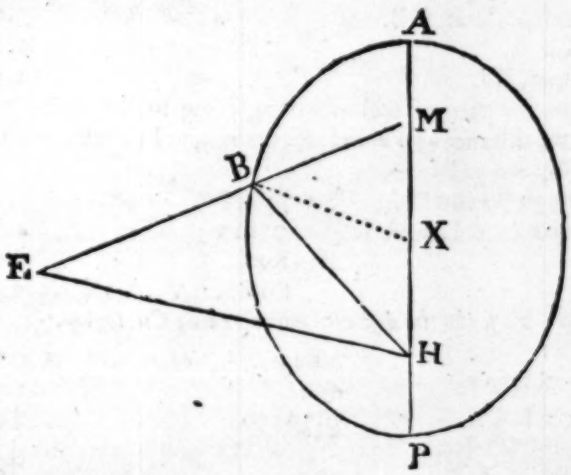
The Semidiameter of the orbe of *Venus*, in ſuch parts of which the Earths orbe is 100.000, by the computation of *Bullialdus* is 72398, her Eccentricity 575. The parts of her greateſt inclination 4270. And the angle it ſelfe 3.38111. In the triangle therefore of the following Diagram M E H, we have three things given.

1. The

1. The halfe ſum of the angles M E H and M H E 19.85465, *viz.* the halfe complement of the meane Anomaly to a circle.

2. The ſide M E	144796		
3. The ſide M H.	1150		
Summe	145946	*co.ar.*	4.8358079
Difference	143646		5.1572934
Tang. halfe ſum.	19.85465		9.5576273
Tangent halfe difference	19.56560		9.5507216
Difference	.28905	} Angle M E H.	
Differ. doubled	.57810	} Angle M B H.	

or the Equation to be added to the mean longitude, becauſe the Anomaly is more then a ſemicircle.



The meane Longitude of *Venus*			265.48714
Equation adde			.57810
The eccentrick place of *Venus*			266.06524
Node ſubtract			74.01537
Argument of latitude K L			192.04987
To finde the diſtance of Venus *from the Sun.*			
As the ſine of M B H	0.57810	*co. ar.*	1.9961373
To the ſide M H	1150		3.0606978
So the ſine of H M B	39.70931		9.8054179
To the ſide B H	72822		4.8622630

To finde the Reduction.

As the Radius			
To the Cosine of the great inclina. X K L		3.38111	9.999:433
So tangent of K L		12.04987	9.329:295
To tangent of X K		12.02950	9.3285728
Difference		.02037	Reduction.

Because the Argument of Latitude is more then 180, the Reduction must be subtracted from the eccentrick place.

The eccentrick place of *Venus*	266.06524
Reduction subtract	.02037
Eccentrick reduced	266.04487

To finde the present inclination.

As Radius			
To the greatest inclinat. E B.	4270		3.6304:78
So sine of K L	12.04987		9.3196533
To the inclinat. X L	891		2.9500811

Which are the parts of inclination agreeing to the common Radius 72398, but the distance of *Venus* from the Sun, 72822 being put for Radius, the inclination will be 896.

As the common Radius D L	72398	*co.ar.*	5.1402735
To *Venus* distance B H or A L	72822		4.8622630
So is X L	891		2.9508115
To X L	896		2.9526176

To finde the distance corrected by Curtation.

As A L	72822	*co.ar.*	5.1377370
To Radius, so is X L	895		2.9526176
To the sine of L A X	0.70550		8.0903546
As Radius			
To A L	72822		4.8622630
So Cosine of L A X	0.7055		9.9999671
To A X	72816		4.8622301

To finde the second inequality of Venus.

We must have given, 1. The angle N A S which is to be found by subducting the Suns place from the eccentrick of *Venus* reduced, or this from it so that less then 6 signes may remain, this remainer is the Anomaly of the orbe and the complement is the angle N A S, or the halfe is the halfe sum of the opposite angle.

Example.

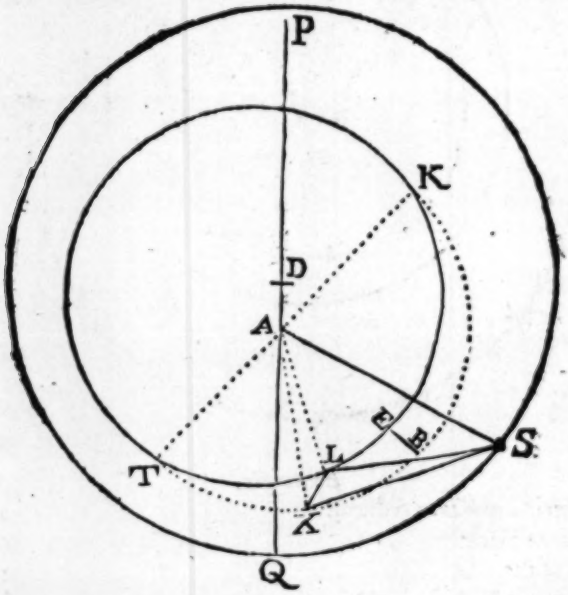
Example.

The eccentrick of *Venus* reduced			266.04487
The Suns true place			154.07347
Anomaly of the orbe			111.97140
Complement is N A S			68.02860
Halfe Anomaly			55.98570

Theſe given with the ſides N A and S A the Analogies are.

As the greater ſide S A	100895	*co.ar.*	4.9961293
Is to Radius			10.0000000
So is the leſſer ſide N A	72816		4.8622300
To the tangent of	35.81815		9.8583593
Adde	45.		
As Radius			
To cotangent	80.81815		9.2085475
So tang. halfe ſum	55.98570		10.1707787
To tang. halfe diff.	13.46926		9.3793262
Summe	69.45496	Angle ANS	
Difference	42.51644	Angle ASN	

In the ſuperiour Planets, *Saturne*, *Jupiter*, and *Mars*, the ſumme of theſe angles is the elongation, but in the inferiour *Venus* and *Mercury* there difference is the Elongation ſought, and in our Example is to be added to the Suns place, becauſe the Suns place was ſubtracted from the Eccentrick of *Venus* reduced.



Suns true place			254.07347
Elongation A S N add			42.51644
True place of *Venus*			196.58991
To finde the diſtance of Venus *from the Earth.*			
As the ſine of A N S	69.45496	co.ar.	0.0285403
To the ſide A S	100895		5.0038707
So ſine of N A S	68.02860		9.9672296
To the ſide S N	99917		4.9996406
To finde the latitude of Venus from the Earth.			
As the ſide S X	99917	co.ar.	5.0003594
Is to Radius			10.0000000
So is X L	896		2.9526176
To the tangent of X S L	0.51417		7.9529770
which is the South latitude of *Venus*.			

CHAP.

CHAP. 17.

Of the Motion of Mercury.

THe forme of calculating the place of this Planet is the ſame with *Venus*, the Dimenſions of whoſe orbs we ſhall give you, as the learned *Bullialdus* hath computed them, but firſt we will ſet down the middle motions thereof to the former time.

The middle motions of Mercury.

	An. Chriſt.	*Longit.* ☿	*Aphel.* ☿	*Node* ☿
	1500	352.53750	248.73556	039.85639
	80	59.53472	2.31611	2.12417
	6	326.41889	.17361	.15917
July		147.58583	.01694	.01528
D	16	65.47806	.00126	.00117
H	18	3.06917		
P	4564	.07781		
Meane Mot.		234.70198	251.24348	42.15618
Aphel. Subt.		251.24348	*Reſt Anom.*	343.45850

The proportion between the Earths orb, and the orbe of *Mercury* is as 100.000 to 38585 Semicentricity in the ſame parts is, 8105. The parts or greateſt inclination 4635. And the angle it felfe 6.90. In the triangle therefore M E H, of the firſt Diagram of the former Chapter we have known. 1. The halfe ſum of the oppoſite angles M E H and M H E, 8.27075 the halfe of 16.54150 which is the complement of the meane Anomaly, 343.4585 to a circle.

2. The ſide M E	77170		
3. The ſide M H	16210		
Summe	93380	*co. ar.*	5.0297462
Differ.	60960		4.7850449
So tang. halfe ſum.	8.27075		9.1628126
To tang. halfe differ.	5.42532		8.9776037
Difference	2.84543	Angle M E H	
Difference doubled	5.69086	Angle M B H or the E-	

quation to be added to the meane longitude, becauſe the Anomaly is more then a ſemicircle.

Example.

The meane Longitude of *Mercury*	234.70198
Equation adde	5.69086
Eccentrick place	240.39284
Node ſubtract	42.15618
Argument of Latitude K L	198.23666

To

To finde the distance of Mercury from the Sun.

As the sine of M B H	5.69086	co.ar.	1.0036592
To the side M H	16210		4.20978[illegible]0
So sine of E M H	16.54150		9.4544022
To the side B H	46541		4.6678444

To finde the Reduction.

As Radius, to cosine of X K L	6.90	9.9968431
So tangent of K L	18.23666	9.5178453
To tangent of X K	11.11322	9.5146884
Reduction	12344	

And because the argument of Latitude is more then 180, it must be subtracted from the eccentrick place 240.39284

And then the eccentrick reduced will be. 240.26940

To finde the present inclination.

As Radius			
To the greatest inclination E B	4635		3.6660497
So sine of K L.	18.23666		9.4954646
To the inclinat. X L	1450		3.1615143

Which are the parts of inclination agreeing to the common Radius 38585. But the distance of *Mercury* from the Sun being put for Radius, the inclination will be. 1749

For as Radius D L	38585	co.ar.	5.4135815
To *Mercury* dist. B H or A L	46541		4.6678444
So is X L	1450		3.1615143
To X L	1749		3.2429402

To finde the distance corrected by Curtation.

As A L	46541	co.ar.	5.3321556
To Radius			10.0000000
So is X L	1749		3.2429402
To the sine of L A X	2.15437		8.5750958
As Radius			10.0000000
To A L	46541		4.6678444
So cosine of L A X	2.15437		9.9996929
To A X	46509		4.6675373

To finde the second inequality of Mercury.

We must have given, 1. The Angle N A S which is to be found by subducting the Suns place, from the eccentrick place of *Mercury* reduced, or this from it, so that less then 6 signes may remain, this remainer is the

Anomaly

Anomaly of the orbe, and the complement thereof is the Angle N A S, or the halfe, is the halfe ſum of the oppoſite angles.

Example.

The eccentrick of *Mercury* reduced			220.26940
The Suns true place			154.07347
Anomaly of the orbe			96.19593
Complement is N A S			83.80407
Halfe Anomaly			48.09796

Theſe given with the ſides N A and S A, the Analogies are

As the greater ſide S A	100895	*co.ar.*	4.9961293
Is to Radius			10.0000000
So is the leſſer ſide N A	46509		4.6675373
To the tangent of	24.74799		9.6636666
Adde	45.		
As Radius			
To the cotang. of	69.74799		9.5669785
So tang. halfe ſumme	48.09796		10.0470559
To tang. halfe difference	22.35160		9.6140344
Summe	70.44956	Angle	A N S
Difference	25.74636		A S N

Becauſe the Suns place was ſubtracted from the eccentrick of *Mercury* reduced, therefore the angle of Elongation A S N muſt be added to the Suns place.

Suns place.	154.07347
Elongation A S N adde	25.74636
True place of *Mercury*	179.81983

To finde the diſtance of Mercury *from the Earth.*

As the ſine of A N S	70.44956	*co.ar.*	0.0257898
To the ſide A S	100895		5.0038707
So the ſine of N A S	83.80407		9.9974536
To the ſide S N	106442		5.0271154

To finde the Latitude of Mercury *from the Earth.*

As the ſide S X	106442	*co.ar.*	4.9728846
Is to Radius			10.0000000
So is X L	1749		3.2429402
To the tang. of X S L	0.94169		8.2158248

Which is the ſouth Latitude of *Mercury*.

CHAP.

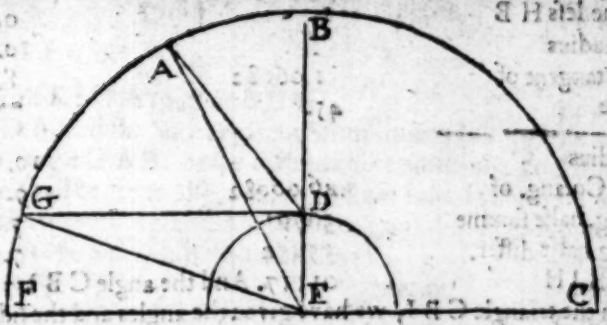
CHAP. 18.

Of the Semidiameters of the Sun, Moon, and ſhadow of the Earth.

THe angle of the Suns apparent Semidiameter, in his neareſt diſtance to the Earth, *Bullialdus* hath by obſervation found to be 16′ 45″, or in Decimall numbers 27917. And by an Eclipſe of the Moon, *December* 1628, he found her Semidiameter to be 16′ 54″ or 28167, and the Semidiameter of the Earth; ſhadow 44′ 9″, or 7 583, at which time (being the time of incidence) her diſtance from the Earth by his computation was 97908 parts of the Semiaxis of the Elipſis 100.000. By this and another obſervation in the ſame Eclipſe, he ſheweth how to finde her apparent ſemidiameter, in all the other intervalls. The inferiour limbe of the Moon and the firſt Starre in the foot of the former Twin, (whoſe place then according to *Tycho* was *Gemini* 28.25′17″, or *Gemini* 28.42138 with South Latitude, 0 d. 58′ or 0.96667.) being in the ſame Azimuth, was 8′ or 13333 higher then the Star and the Altitude of the heart of *Hydra* then taken by him at *Paris* was 30 deg. 37′, or 30 d.61667. From whence the hour was found, 30 h. 40′, or 13 h.66667 and the houre being given the altitude of the Starre is alſo given, deg. 56. 42′ 15″, or deg. 56. 70416. The apparent altitude of the center of the Moone was deg. 57 7′ 9″, or deg. 57 11916, but by her latitude and place it ſhould have beene deg. 57 40′ 4″, or deg. 57 66778 and therefore her parallax of altitude 32′ 55″, or 54861. The ſituation of the Moone and Azimuth in which her interiour limbe and the Stars were, being given, her aparent Longitude was almoſt in *Gemini*, deg. 28 38′ 30″, or *Gemini* deg. 28 64167, her parallax of longitude 18 min. or 30000 and therefore the center of the Moon in her true motion in *Gemini* 28 d. 57 min. *fere*. or in *Gemini* 28 d. 95000, her parallax of Latitude is 19 min. or 31667. to which 21′ or 35007, the difference of the obſerved latitude of the Moon and Stars, being added the true difference is 50 min. or 83333 min. and thence the Moons Latitude 8 min. or 13333 S.

Now then to finde the diſtance of the Moon from the Earth, in this Eclipſe, the Earths ſemidiameter being one degree, Let F E C repreſent the true Horizon, B D E, the vertical at *Paris* E the center of the earth, D the City of *Paris*: the Moons true altitude, A E F, deg. 5766778, the obſerved altitude A D G, deg. 57 11916. The parallactical angle D A E, deg. 0.34861. Therefore in the Triangle A D E we have given all the angles, and the ſinde D E one Semidiameter of the Earth, to finde A E, for which the anolagy is.

As



As the sine of D A E 0 d.	54861	co. ar.	2.0188745
To the side D E 1			0.0000000
So is the sine of A D B 32 d.	88084		9.7347147
To the side A E	56.70		1.7535892

This foundation being laid, he proceedeth to the rest: and to shew how we may possibly fall into some absurditie, he supposeth the Moons distance from the Earth in this Eclipse to be but 55 semidiameters, or the side B C in the following figure, the apparent angle of the semidiameter of the Earths shadow C H I, 0.73583 A E F represents the Sun, his semidiameter A E, the angle of his apparent Semidiameter when he is Perig. A G E 16.45, or in decimalls 27916 B H G represents the Earth, B G the Semidiameter thereof, hence to finde H I in the triangle H I C the proportion is.

As the sine of H I C	89.26417	co. ar.	0.0000358
To the side H C	54		1.7323937
So is the Radius H C I	90		10.0000000
To the Hypothenusal H I	54.004		1.7324295

2. In the triangle H B I we have given the sides B H, 1. and H I 54.004 with the angle B H I 179.26417, hence to finde the Angle B H I, the Analogie is.

As the greater side H I	54.004	co.ar.	8.2675705
Is to the less H B	1.		0.0000000
So is Radius			10.0000000
To the tangent of	1.06082		8.2675705
Adde	45.		

As Radius		10.0000000
To the Cotang. of	46.06082	9.9839145
So Tang. halfe summe	36791	7.8075980
To tang. halfe differ.	35454	7.7915125
Angle B I H	01337. And the angle C B I 72246	

3. In the triangle C B I, we have given the angles and the side B C 55 to find C I. Therefore say,

As Radius		
To the tangent of C B I	72246	8.1007064
So is B C 55		1.7403627
To C I 0.6935 = to B K		1.8410691

and therefore K G 3065, and the angle K I G 0.31857.

For, As I K 55	co. ar.	8.2596373
To Radius		10.0000000
So is K G 0.3065		1.4864305
To the tangent of K I G 0.31857		7.7460678

and the angle B D G is equal thereunto, but so the angle of the Suns apparent Semidiameter A D E 27936 by observation, is lesse then the angle A D E, which is absurd, and therefore some part assumed is false. The Semidiameters of the Sun and Moon must not be changed, constant experience agreeing with these observations.

In this Eclipse therefore *Bullialdus* doth take for the distance of the Moone from the earth, B C 57.85 Semidiameters of the earth, and the Semidiameter of the earths shadow, C B I 75812. Hence to find C I, the analogie is.

As Radius		
To the side B C	57.85	1.7623034
So the tang. of B C	0.75111	8.1176019
To C I.	0.75841	1.8799053

Let B K be equal to C I. So is K G 24159. Then

As

As I K	57.85	co. ar.	8.2336066
To Radius			10.0000000
So is K G	24159		1.3830789
To the tang. of K I G. 23928 or B D G			7.6207755

equal to E D A, and the Suns apparent Semidiameter being given A G E, 27916, the angle G A B, or the difference between the angles A G E, and E D A shall be given also, *viz.* 03988. the Suns Horizontal parallax when he is Perigæon. And the Moones Perigæon distance from the earth, in Syzigiis, 56. 50 Semidiameters of the earth.

For, as	27908	co. ar.	5.0091819
To	57.85		1.7623034
So is	25638		4.9080305
To B C	56.50		1.7521157

Hence to find the Moones Horizontal parallax when she is perigæon, the analogie is, in the preceding Diagram.

As E G or B C	56.50	co. ar.	8.2478843
Is to Radius: So is D E	1.		0.0000000
To the sine of E G D	1.01399		8.2478843

The Horizontal parallax of the Sun when he is perigæon or the angle B A G was found to be .03988

The Moones Horizontal parallax is	1.01399
Their aggregate	2.05387
Semidiameter of the Sun *suberali*	.27916
There rests the angle C B I	.77471

or the apparent semidiameter of the earths shadow *in loco translati Lunæ, Perig.*

In the triangle therefore B C I, we having the angles and the side B C given, C I shall be also given.

For, As the sine of 90 deg.			
Is the side B C	56.50		1.7521157
So tang. of C B I	77472		8.1310339
To the side C I	7640 = B K		1.8831496

And therefore K G 9360.

And in the triangle A G B having the angles and B G given the side A B is also given, for

As the tang. of B A G	03988	co. ar.	3.1585680
Is to B G	1. So is Radius		10.0000000
To A B	1440.66		3.1585520

which is the distance of the Earth from the Sun, when he is Perihelion. And because the Suns eccentricity is 1784, his Apogæan distance is 101784, hence to find his distance, in Semidiameters of the earth, say,

As his Perigæan distance	98216	co.ar.	5.0078178
Is to his distance	1440.66		3.1585620
So is his Apog. distance	101784		5.0076794
To his Apog. dist.	1493.03		3.1740692
Then as B S	1493.03. or E G		6.8259308
To Radius, so is E D	1		10.0000000
To the sine of E G D	0.3855		6.8259308

The Suns Horizontal parallax when he is Apogæon.

As Radius, to A B:	1440.66		3.1585620
So is tang. of A B E	27916		7.6877120
To A E	70189		0.8462740
Then as B S	1493.03	co. ar.	6.8259308
To Radius, so is S T	70189 ⊙ Semid.		0.8462740
To the tang. of S B T	26936		7.6722048

The apparent Semidiameter of the Sun when he is Apogæon.

The Sun being Perigæan, we have given B G 1. K B, 75841. K G. 24159 and B C. 56.50, the distance of the Moon from the Earth when she is Perigæan; from whence the longitude of the earths shadow may this be found.

As K G	2360	co.ar.	10.6270880
To K I	56.50		1.7521157
So is C I	7640		1.8831496
To C D	182.93		2.2623533

Add B C 56.50 then is B D 239.43. the longitude of the earths shadow.

Let B S be the *Apogæan* distance of the Sun,	1493.03
The angle of the Suns apparent Semidiameter S G T	26936
The Perigæan Semidiameter or the angle A G E	27916
Their difference is the angle Z G E	00980

Let T G be produced to N, then shall the angle I G N be equal to the angle Z G E, but the Sun being Perigæan, the angle B D G was found to be 0. degrees 23918. whose complement is the angle B G D 89.76072 therefore when the Sun is Apogæan, it shall be 89.77052, therefore B X G 0.27948, equal to K N G.

Hence

Hence to find K G the analogie is.

As Radius 90			10.0000000
To K I	56.50		1.7521157
So tang. of K I G	0.22948		7.6006035
To K G	22632		1.3547192
And K B	77368. Then to find C B N. Say.		
As B C 56.50		co.ar.	8.2478843
To Radius 90			10.0000000
So C I or rather C N. 77368			1.8885613
To the tang. of C B N	78442		8.1364456

The Sun being *Apogæan*; and the angle C B I, the Sun being *Perigæan*, was before found to be 77471, and therefore the difference of the earths shadow between the Suns *Apogæan* and *Perigæan* is, 00971. Then,

As K G	22632	co.ar.	10.6452808
To K I	56.50		1.7521157
So is C N	77368		1.8885613
To C X	193.18		2.2859578
Add B C	56.50. Then is B X 249.68.		

The semidiameter of the Moon, when she is *Perigæan*, is greater then the semidiameter of the Sun, being *Apogæan*, and therefore *Bullialdus* doth make it 17. or 28333, and because the eccentricity of the Moon is given 4362, her *Apogæan* distance in *Syzygiis* 104362, the Moon being *Perigæan* her distance from the earth is, 95638, and in semidiameters of the earth 56.50 and therefore her *Apogæan* distance in semidiameters of the earth, by the analogy following,

As 95638		co.ar.	5.0193696
To 56.50			1.7521157
So is 104362			5.0185423
To 61.66			1.7900276
As her *Apogæan* dist. 61.66		Co. ar.	8.2099724
To the Moons *Perig.* semid. 28333			1.4522925
So is the Moon *Perig.* dist. 56.50			1.7521157
To the *Apog.* semid. 25964			1.4143806

We have the semidiameter of the Cone C I 76400, and her *Perigæan* distance 56.50, and D C 182.93, but when the Moon is *Apogæan*, D C will be no more then 177.77. found by abating K I or K N 61.66. from B D 239.43. Hence to find C I or C N in the same parts say,

As D C	182.93	co. ar.	7.7376467
To C I	7640		1.8831406
So is C D	177.77		2.2498584
To C I	7424		1.8706547
Then as B C	61.66	co. ar.	8.2099724
Is to Radius	90		10.0000000
So is C I	7424		1.8706547
To the tang. of C B I	.68981		8.0806271

Here then we have determined

The Suns Semidiameter	Apogæon	26936
	Perigæon	27916
His distance from the earth	Apogæon	1493.03
	Perigæon	1440.66
The Axis of the earths shadow	Apogæon ☉	249.68
	Perigæon ☉	239.43

The Semidiameter of the shadow, when the Sun is Apogæon. *In loco transitus Lunæ*, Apog 78442 Perig. 77471.

The Semidiater of the Moone in Syzygiis	Apogæon	25964
	Perigæon	28393
The distance of the Moon from the earth in Syzygiis	Apog.	61.66
	Perig.	56.50
Semiangle of the Cone	Perig.	23928.
	Apog.	22948.

CHAP. 19.

Of the Proportion and Magnitude of the three great bodies, the Sun, Moon and the Earth.

THat it is a hard matter exactly to determine the true Magnitude of the cœlestial bodies, is not I beleeve deuied by any, it will be therefore sufficient if we shall determine them so, as that there be no sensible errour in them; and to such exactnesse, we may traaine by the rules and proportions following.

As

As the Semidiameter of the Earths ſhadow C B I. Is to the Semidiameter of the ſhadow in parts of the Earths Semidiameter C I = B K: So is the apparent Semidiameter of the Moon. To the Semidiameter of the Moone in parts of the Earths Semidiameter, that is

As C B I 77471	co. ar.	10.1108609
To C I 7640		1.8831496
So is the Moones ſemid. 28333		1.4522925
To the Moones ſemid. 27945		1.4463030

And Sphears being in triplicated proportion of their diameters, the proportion of the earth to the Moone will be as 1.000000.000000.000000. the Cube of the earths Semidiameter to 0.0218228939.33625. the Cube of the Moones ſemid. 27945. and therefore dividing the earths Semidiameter by the Moons, the quotient will be 45.823, and ſo many times is the body of the Moon contained in the Earth.

The proportion between the Semidiameter of the Earth and the Semidiameter of the Sun, may be found by this analogy,

As Radius 90		
To A B 1440.66		3.1585614
So is tang. A B E 27926		7.6877069
To A E 7.0189		0.8462683
But if to A B	1440.66	
You adde B D	239.43	
Their ſumme is A D	1680.09	
And then, As Radius 90		
To the ſide A D 1680.09		3.2255485
So is tang. of A D E or K I G 23928		7.6207755
To A E 7.0197		0.8463270

And now if you take the leſſer ſemidiameter of the Sun, the Cube thereof will be 45.781, but taking the Semidiameter of the Sun to be but 7 ſemidiameters of the earth, the Sun will be 343 times bigger then the Earth.

The proportion of the Semidiameter of the earth and the Moone is as 1 to 27945 of the Sun and the Earth as 7 to 1, and therefore of the Sun and the Moon as 7 to 27945. The Cube of 7 is 343, the Cube of 27945 is 0.0218228cc, by which dividing the Cube of the Suns ſemidiameter the quotient will be 15719.49 and ſo many times is the Moone contained in the Sun.

CHAP.

CHAP. 20.

Of the proportion between the Orbs of the ſuperiour and inferiour Planets, and the Orb of the Earth.

WHat proportion the Orbs of theſe Planets have to the earths Orb, we have ſet down in thoſe Chapters, in which we have ſhewed the manner of computing their places, and by what meanes the truth of thoſe proportions may appeare, we ſhall ſet downe in this, and becauſe we have uſed thoſe proportions which *Bullialdus* hath with great diligence computed; we ſhall exhibit here an Example in *Saturne* according to which method the proportions between the orbe of the earth and the orbes of the other planets are alſo to be found.

And *Saturns* proportion to the earths orbe, as *Bullialdus* hath determined it, and which we have uſed, Chap. 13. is as 100.000 to 10480.

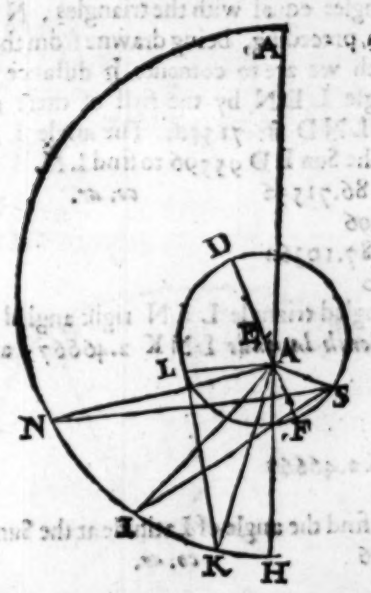
The obſervation from whence this proportion is gathered was made *Anno Chriſti* 1587. *January* the 9th. Hour 9th. 75 parts, at which time *Saturn* was obſerved to be in *Aries* 26, 13333. with South latitude, deg. 2. 46667. The Suns true place then was in ♈ deg. 29, 41778. and his diſtance from the earth, 98374. *Saturns* true place from the Sun by calculation was in ♉ deg. 2, 31416. whoſe difference from his obſerved place, deg. 6, 18083. is the parallax of the orbe or the angle A N S, and the angle N A S, 87. 10362, is found by deducting *Saturns* place from the place of the Sun, which with his diſtance from the Sun or ſide A N 95596 being given, the ſide A S will be found to be 10310.

Now as the Suns diſtance from the earth,	98374
Is to the diſtance,	10310
So is the Semidiameter of ♄ orbe,	100.000
To the Semidiameter of the earths orbe,	10480

By a ſecond Obſervation made *Anno Chriſti* 1590, *February* 8, about 8 of the clock in the evening; *Saturn* was in *Gemini*, deg. 7. 53333. with South latitude, deg. 1. 50. The true place of the Sun at the ſame time was in *Piſces*, deg. 0. 02805. and his diſtance from the earth, 98953. And *Saturns* place from the Sun by calculation was in *Gemini*, deg. 13. 82167. from which deducting his place taken by obſervation, their difference, 6. 28834 is the parallax of his orbe, repreſented by the angle A I S. And ſubtracting

ing *Saturns* place 73.82167 from the Suns place 320.02805 their differences 256.20638 reject a semicircle is the angle, I A S 76.20638 and *Saturns* distance from the Sun represented by A I 94338 and hence the side A S 10423.

And now as the Suns distance from the earth 9893
Is to the distance A G 10423.
So is the Semidiameter of *Saturns* orbe 100.000
To the Semidiameter of the earths orbe 10533



By a third observation made in the same *year of Christ* 1590 *Septemb.* 7 at midnight, *Saturns* place was in *Gemini* deg. 28.1 with *South latitude* deg. 1.18333. The Suns true place at the same time was in *Virgo* deg 24.49833. And his distance from the earth 100300. *Saturns* place from the Suns by calculation, was in *Gemini* deg. 21.76722, which being deducted from his place taken by observation, their difference is the parallax of his orbe, or the angle A K L 6.33278, and dednct ing *Saturns* place from the place of the Sun the angle A L K is 97.73111, and therefore the side A L 10415.

Now as the Suns distance from the earth	100300
Is to the distance A L	10415
So is the Semidiameter of *Saturns* Orbe	100000
To the Semidiameter of the earths orbe	10383

But *Bullialdus* whom we follow doth retaine the first of these 10480 as being the meane, and most agreeable to *Tycho's* observation; *And from these three observations the inclination of* Saturns *orbe may thus be found.*

The Triangles L D N. I D O, and D G M of the following Diagram, have their sides and angles equal with the triangles, N A S. I A S and L A K in the Diagram preceding, being drawne from the same observations; in every of which we are to compute ♄ distance from the earth; for which in the triangle L D N by the first of these observations we have given the angle L N D 86.71556. The angle L D N 87.10362 and ♄ distance from the Sun L D 95596 to find L N.

As the sine of L N D 86.71556	*co. ar.*	0.0007130
Is to the side D L 95596		4.9804397
So the sine of L D N 87.10362		9.9994447
To the side L N 95630		4.9805974

Then in the right angled triangle L K N right angled at K, we have given the angle of *South latitude* L N K 2.46667, and the side L N 95630, to find L K.

As Radius	10.0000000
Is to L N 95630	4.9805974
So is the sine of L N K 2.46667	8.6338534
To the side L K 4116	3.6144508

Hence to find the angle of Latitude at the Sun say,

As the side L D 95596	*co. ar.*	5.0195603
Is to Radius		10.0000000
So is the side L K 4116		3.6144508
To the Sine of L D K 2.46756		8.6340111

By the second observation in the triangle I D O we have given the angle I O D 97.30528 whose complement is 82.49472 the angle I D O 76.20638, and ♄ distance from the Sun I D, to find his distance from the earth I O.

As

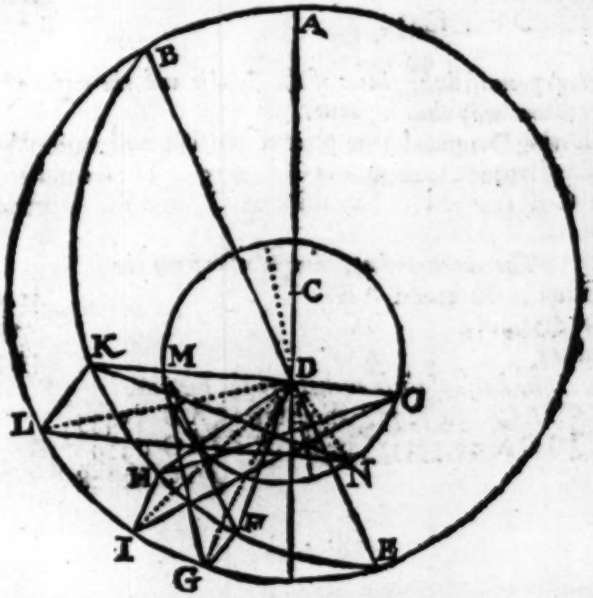
As the sine of I O D 82.49472	co. ar.	e.0037360
Is to the side I D 94338		4.974686
So is the sine of I D O 76.20638		9.987291o
To the side I O 92409		4.9657145

Then in the right angled Triangle H I O right angled at H, we have given the angle of *Saturns South latitude* H O I 1.50, and the side I O to find H I.

As Radius	10.0000000
To the side I O 92409	4.9657145
So is the sine of H O I 1.50	8.4179190
To the side H I 2419	3.3836335

Hence to find the angle of Latitude at the Sun

As the side I D 94338	co. ar.	5.0253134
Is to Radius		10.0000000
So is the side H I 2419		3.3836335
To the sine of I D H 1.46932		2.4089469



By the third observation in the triangle G M D we have given the angle

M D G 87.26889 the angle M G D 86.39833 the ſide G D 94239 to find M G.

As the ſine of G M D 86.39833	*co. ar.*	0.0008588
To the ſine of M D G 87.26889		9.9995064
So is the ſide G D 94239		4.9742306
To the ſide M G 94318		4.9745958

Then in the right angled triangle G M F right angled at F we have given the angle of *Saturns South latitude* G M F 1.18333, and the ſide G M to find G F.

As Radius	10.0000000
Is to the ſide M G 94318	4.9745958
So is the ſine of G M F 1.18333	8.3149535
To the ſide G F 1948	3.2895493

Hence to find the angle of latitude at the Sun,

As the ſide D G 94239	*co. ar.*	5.0257694
Is to Radius		10.0000000
So is the ſide G F 1948		3.2895493
To the ſine of G D F 1.18434		8.3153187

Theſe things premiſed the places of the Nodes and the angle of inclination of the planes may thus be found.

In the following Diagram let the place of the firſt obſervation be at A, and the angle of latitude at the Sun D G 2.46756. The ſecond at B, and the latitude G E 1.46931. The third at C, and the latitude G F 1.18434.

The Arches of apparent motion from the

Firſt obſervation to the ſecond	A B	41.50751
Second to the the third	B C	7.94555
Firſt to the third	A C	49.45306

The halfe of theſe arches are the meaſure

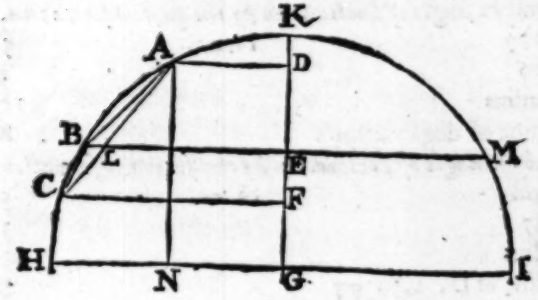
of the angle { B A C 3.97277 } whoſe ſines { A B 35435
{ B C A 20.75375 } are the ſides { B C 6929
{ A C 42828

The

The angles of Latitude at the Sun found are

L D K 2.46756	whose sines	G D 4306	
I D K 1.46932	are the sides	G E 2617	
G D F 1.18434		G F 2064	

The difference between { G E and G F is F E 553; G D and G F is F D 2242; G E and G D is E D 1689



Hence to find the side A L in the triangle A B L use this analogie

As F D 2242	co ar.	6.6493644
Is to C A 41828		4.6214671
So is E D 1689		3.2276296
To A L 31511		4.4984611

Then to find the angle A B L

We have given the side { A B 35435; A L 31511 } and B A L 3.97277

whose complement is 176.02723, and the halfe thereof 88.01361 is the halfe summe of the opposite angles.

As the summe of A B and A L 66946		co. ar.	5.1742754
Is to their difference 3924			3.3937289
So the tang. halfe summe 88.01361			11.4598852
To the tang. halfe differ. 59.38668			10.228895
The summe	147.40029	is the angle	A L B
The difference	28.62693		A B L

whose double 57.25386 is the arch A M, to which if you adde

adde the arch A B 41.50751 their ſumme is the Arch B A M 98.76137, whoſe complement to 180 gives the arch B H and M I 81.23863, and the halfe thereof is the arch B H 40.61931. Now then the point B is in 73.82167

To which if you adde B H 40.61931

The Node aſcending is 114.44098

And deducting B C from B H 40.61931 whoſe natural ſines are G E 65098, G F 53980, G D 99057

Their difference is C H 32.67376

The ſumme of H B and B A is H A 82.12682

To find the angle of Inclination by the firſt obſervation, ſay

As G D 99057 *co. ar.* 5.0041149

To G D 4306 3.6340740

So is G K Radius 10.0000000

To G K the ſine of deg. 2.48908 8.6381889

To find the angle of Inclination by the ſecond obſervation, ſay

As G E 65098 *co. ar.* 5.1864324

To G E 2617 3.4178037

So G K Radius 10.0000000

To G K the ſine of D. 2.30397 8.6042361

To find the angle of Inclination by the third obſervation, ſay

As G F 53980 *co. ar.* 5.2677672

To G F 2064 3.3147096

So is G K 100.000 or Radius 10.0000000

To G K the ſine of deg. 2.19128 8.5824768

But by reaſon of this varietie, we may well ſuſpect the truth of one or other, of the obſervations given; and therefore *Bullialdus* hath aſſigned another place for the point of the Node aſcending; *viz.* deg. 110.42333 and the angle of Inclination ſomewhat more then that found by the firſt obſervation, *viz.* deg. 1.50 that ſo he might make theſe obſervations to agree as neere as might be.

And now if you ſuppoſe the Node aſcending to be 110.42333

And from thence deduct the place of the 2d. obſervation 73.82167

Their difference ſhall be the arch H B 36.60166 and the ſine thereof is G E 59624. Againe deducting B C 7.94555 from B H, their difference will give C H 28.65611, and the ſine thereof G F 47954.

And

And by adding A B 41.50751 to H B their ſumme ſhall be H A 78.10917 and the ſine thereof G D 97854.

For the latitude agreeing to the firſt obſervation

As G K 100.000	5.0000000
Is to G K deg. 2.50	8.6396795
So is G D 9.7854	4.9905785
To G D or the latitude 2.44632	8.6302580

whereas it ſhould have been 2.46667.

For the latitude agreeing to the ſecond obſervation

As G K 100.000	5.0000000
Is to K G deg. 2.50	8.6396795
So is G E 59624	4.7754210
To G E or the latitude 1.49029	8.4151005

whereas it ſhould have been 1.56667.

For the latitude agreeing to the third obſervation

As G K 100.000	5.0000000
Is to G K or the angle of inclin. 2.50	8.6396795
So is G F 47954	4.6808248
To G F or the ſine of latit. 1.19856	8.3205043

whereas it ſhould have been but 1.19

CHAP. 21.

To find the meane Conjunction and Oppoſition of the Sun and Moon.

FOr this purpoſe the Table which *Shakerley* tranſcribed from *Bullialdus*, we have here exhibited in Decimall numbers, the uſe whereof, as he hath explaind the ſame is this: Set down firſt the Epocha next preceding the yeare given, then the yeares and monethe compleate having a care of the yeare Biſſextile, and to every one ſet downe the time anſwering in the Table; then adde them altogether, and the ſumme ſubtract from the next greater in the Canonian, under the title ☌, if you ſeek a Conjunction, or ☍, if an oppoſition, the remainar ſheweth the time required compleat from the beginning of the moneth current.

Example.

I would know the time of the meane oppoſition of the Sun and Moon in *March*, 1652. The worke is this.

The

	Hou. Parts
The Epocha 1640	701.96639
Yeares compleat 11	20.14722
February compleat Biſſextile	022.53539
The ſumme ſubtract	744.64500
From the *Oppoſition* next greater	1063.10139
Reſts the meane oppoſition	318.45639

that is 13 dayes 6 houres and 45639 parts.

CHAP. 22.

To find the true Oppoſition or Conjunction of the Sun and Moon.

FOr the time of the meane Conjunction or Oppoſition given, find the true place of the Sun, and the eccentrick place of the Moon, and compare them; if they either be preciſely the ſame or preciſely oppoſite, the time of the true Conjunction or Oppoſition agrees with the meane; but if they differ take the difference, by ſubtracting the leſſe from the greater, and that call the diſtance of the Sun and Moon.

2 Out of the Table of Semidiameters, and hourly motions; with the meane Anomalies of the Sun and Moon, take out their hourly motions, and ſubtract the hourly motion of the Sun, from the hourly motion of the Moon, by the remainer (which is the hourly motion of the Moon from the Sun) divide the diſtance of the Sun and Moone before kept, the quotient gives the time, which muſt be added to the mean time of Conjunction or Oppoſition, if the exceſſe be in the Suns place, or ſubtracted, if in the Moones place.

3 At this time thus corrected, find againe the true place of the Sun and eccentrick place of the Moon, together with their diſtance, and repeat your former work, till you find them abſolutely to concurre, and the time thus found ſhall be the true time of Conjunction or Oppoſition.

As in the Example,

	D.	Hou. parts
At the time of the meane ☌ *March*	13	6.45639
The true place of the Sun is		4.85039
The Eccentrick place of the Moone		180.38631
The Diſtance of the Sun from ☌ Moon		4.46408
Mean Anomaly of the Sun		266.40860
His hourly motion		.04112

Meane

Meane Anomaly of the Moone	30.26681
Her hourly motion	.51827
Hourly motion of the Moone from the Sun	.47715
By which dividing the distance	4.46408
The quotient gives Hours 9.3558 to be added.	
So the time first corrected *March*	13 15.81279
The true place of the Sun is	5.23520
The eccentrick place of the Moone	185.15798
The distance of the Sun from ☍ of the Moon	.07722
Which divided by the hourly motion of the Moon from the Sun	.48114
Gives in time to be added	.16049
So the time secondly corrected	13 15.97328
The true place of the Sun is	5.24180
The eccentrick place of the Moon	185.24010
The distance of the Sun from ☍ the Moon	.00170
Which divided by the hourly motion of the Moon from the Sun	.48121
Gives in time to be added	.00353
So the true time	13 15.97681
The true place of the Sun is	5.24194
The eccentrick place of the Moon	185.24190

4 For this time find out the true motion of the Moons Latitude, and thereby the Reduction, which divide by the hourly motion of the Moon from the Sun, and the quotient contrary to the title of Reduction, apply to the last corrected; so have you the true time. In our Example.

The true motion of Latitude		174.04881
The Reduction	*Adde*	.02398
The quotient	*Subt.*	.04983
So the true opposition		13 15.92698

5 Lastly, apply the equation of time to this equal time to make it apparent.

The true time of the ☍		13 15.92698
The equation of time	*Subt.*	.02884
The apparent time of the ☍		13 15.89814

CHAP. 23.

To find whether there will be an Eclipse or not.

THere are two wayes to know this, of which the one is more easie, the other more certain, The first is this; At the true conjunction, if the true motion of latitude be within 17 degrees backward or forward of 6 or 12 signes, or at the oppositon within 12 degrees, there is a possibility of an Eccliplse, otherwise not.

In our Example the Moons true motion of latitude is 174 deg. 04881, which being not fully 6 degrees distant from 6 signes, shewes the neeessity of an Eclipse.

The other way is this. If at the visible conjunction the visible latitude of the Moon be lesse then the aggregate of the Semidiameters of the Sun and Moon, there must be an eclipse or else not. 2. If at the true opposition the true latitude of the Moon, be lesse then the summe of the Semidiameters of the Moon and the earths shadow, there must be an Eclipse otherwise not.

This latter way is most certain, onely subject to this inconvenience, that a great part of the calculation is performed before we come to the *criterion*, or power to judge of the possibility.

CHAP. 24.

To find the Quantity of a Lunar Eccliplse.

BY the true motion of the Moons Latitude, find her true latitude, according to the former directions: this in our example is 0.51496 North Descendant.

2 Find out the Semidiameter of the Moon by her meane anomaly out of the Table, as also her Horizontall parallax; and with the meane anomaly of the Sun, take out the Semiangle of the Cone of the shadow; and this subtract from the Moons Horizontall parallax, there rests the Semid. of shaddow.

3 Adde together the Semidiameter of the shadow, and Semidiameter of the Moon, and from the summe subtract the Latitude of the Moon, the remainder is the scruples of the Moons diameter ecclipsed.

Example.

Example.

Horizontall parallax of the Moon		.94409
Semiangle of the Cone	*Subt.*	.23455
Semidiameter of the ſhaddow		.70954
Semidiameter of the Moon		.26431
Summe of the Semidiameters		.97385
Latitude of the Moon,	*Subt.*	.51496
Scruples deficient		.45889

4 Convert theſe Scruples into digits or parts, whereof the Moones body containes 12, thus,

As the Moones diameter 52862	*co. ar.*	5.276857
Is to the Scruples deficient 45889		4.661708
So is 12 digits		1.079181
To the digits eclipſed 10.417		1.017746

Yet note that Lunar Eclipſes are of three ſorts.

1 Partiall, when the Scruples deficient are leſſe then the diameter.

2 Totall without continuance when they are equall.

3 Totall with continuance when the ſcruples deficient are greater then the diameter, and in theſe the digits eclipſed are more then 12, which are ſo to be underſtood, as that they ſhew how far the eccliple is over the body of the Moon.

CHAP. 25.

To find the duration of a Lunar Eccliple, or the continuance of the totall darkneſſe, where the Eccliple is totall.

FInd the ſcruples of Incidence thus: Take the Logarithmes of the ſumme and difference, of the Moones latitude and the ſumm of the Semidiameters of the Moon, and the ſhadow, halfe the ſumme of the two Logarithmes ſhall be the Logarithme of the Scruples of incidence required.

Example.

Summe of the Semidiameters	97385	
Latitude of the Moone	51496	
Their ſumme	1.48881	5.172836
Their difference	.45889	4.661308
Summe of the Logarithmes		9.834544
Scruples of incidence	82656	4.917272

2 Divide the Scruples of incidence by the hourly motion of the Moon from the Sun, the quotient gives the time of incidence or halfe duration of the Eclipſe. This ſubtracted from the true time of the oppoſition gives the beginning of the Eclipſe; or added to it gives the ending.

Example.

The Scruples of incidence	82656	4.917272
Divided by the hourly motion of the Moon from the Sun	48121	4.682326
Time of incidence, hours	1.7177	0.234946
The true time of the oppoſition	13 d.	15.89814
Time of incidence *ſubt.*		1.71770
The beginning of the Eclipſe		14.18044
Time of incidence added, gives the end		17.61584
The whole duration		3.43540

3 If the Eclipſe be total and you deſire to know the continuance of total darkeneſſe, take the difference of the Semidiameters inſtead of the ſum, and thereby worke as you are directed in the firſt example of this Chapter, and you have the halfe tarriance in the ſhadow, whoſe double is the thing ſought.

CHAP. 26.

To find the Moons Latitude at the beginning and end of the Eclipſe.

MUltiply the Suns hourly motion, by the time of incidence, the product being added to the ſcruples of incidence, gives you the motion of the Moone agreeing to the time of incidence.

2 From the true motion of latitude at the true oppoſition ſubtract this motion of the Moon; there reſts the true motion of latitude at

at the beginning of the Eclipſe; or if you adde it you have the motion of latitude at the ending, with which out of the Table of latitude you may find out the latitude, anſwering to the beginning and end, as in our Example.

The time of incidence		1.7177
The Suns hourly motion		.0411
Their product is		.07059
The ſcruples of incidence		.82636
The ſumme		.897155
Motion of Latitude at true ☍	174.04882	
Motion of Latitude at beginning	173.15166	
Latitude at beginning North Deſc.	.59223	
Motion of Latitude at ending	174.94596	
Latitude at ending North Deſc.	.43746	

CHAP. 27.

To find the middle of the Eclipſe or gre meſt darkeneſſe.

THe time of the true Conjunction or Oppoſition the moſt received, is when the Sun and Moon are in one line perpendicular to the Ecliptique, to find this with the Moons true Latitude at the true oppoſition, enter the little Table of the difference of the true Conjunction or oppoſition from the greateſt obſcuration, and you ſhall find the difference with the title, which divide by the hourly motion of the Moon from the Sun, and the quotient according to the title, apply to the time of the true oppoſition; ſo have you the time of the greateſt darkeneſſe, or middle obſcuration.

Example.

The Moons Latitude, North Deſcend.		.51496
The difference	*adde*	.04489
Which divide by the hourly motion of the Moon		.48121
Gives the difference in time to be added		.09328
To the true oppoſition *March* 13.15		.89814
So the middle of the Eclipſe	13. 15'.	.99142

The

The Calculation of the forementioned Eclipse according to the preceding directions.

			d. ho.
Meane oppoſition	*March*		13 6.45630
Interval	*Adde*		9.35580
True oppoſition			13. 15.97681
True place of Sun			5.24194
Eccentrick place of the Moone			185.24190
Meane Anomaly of the Sun			266.79954
Meane Anomaly of the Moone			35.44378
True motion of Latitude			174.04881
True Latitude *North* deſcend.			.51496
Reduction	*Adde*		.02398
Hourly motion of the Sun			.04111
Hourly motion of the Moon			0.52232
Hourly motion of the Moon from the Sun			.48121
Reduction in time *Subt.*			.04983
True oppoſition corrected			13 15.92698
Equation of time *Subt.*			.02884
Trueſt oppoſition			13. 15.89814
Horizontall Parallax of the Moone			.94409
Semiangle of the Cone			.23455
Semidiameter of the ſhadow			.70954
Semidiameter of the Moone			.26431
Sum of the Semidiameters			.97385
Scruples deficient			.45880
Digits eclipſed			10.4197
Scruples of incidence			.82656
Time of incidence			1.71770
Beginning of the Eclipſe			13 14.18044
End of the Eclipſe			13 17.61584
The whole duration			3.43540
Latitude of the Moone at the beginning	*North* D.		.59223
Latitude of the Moone at the ending	*North* D.		.43746
Difference from the middle, Added			.09328
The middle of the Eclipſe		13.15	.99142

CHAP.

CHAP. 28.

Of the Calculation of the Suns Eclipse.

THis Eclipse is not properly, the Eclipse of the Sun, but of the earth in regard it is not the Sun, but the earth which looseth light the Sun being only apparently darke, the earth in truth, we will how ever use the name, that others have given it, and shew you the manner of the Calculation.

Find the meane conjnction, and from thence the true, which correct by the Reduction and Equation of time in all things as in the Moon.

Example of a Solar Eclipse, which happened March 28. 1652.

	D	
Mean Conjunction *March*	28	0.82333
Suns place		19.36150
Eccentrick place of the Moon		20.89832
Distance of the Moon from the Sun		1.53682
Meane Anomaly of the Sun		280.96132
His hourly motion		.04c90
Meane Anomaly of the Moon		223.17513
Her hourly motion		.60109
Hourly motion of the Moon from the Sun		.56019
which dividing the distance		1.53682
Gives in the quotient *subt.*		2.74336
So the time first corrected	27	22.07997
True place of the Sun		19.24962
The Eccentrick place of the Moon		19.29533
The distance of the Sun from the Moon		.04571
which divided by the hourly motion of the Moon from the Sun		.56137
Gives in time *subtract*		.08143
So the time secondly corrected	27	21.99854
True place of the Sun		19.24631
Eccentrick place of the Moon		19.24766
Distance of the Sun from the Moone		.00135
which divided by the hourly motion of the Moon from the Sun		.56140
Gives in time *subtract*		.00240
So the true time of Conjunction	27	21.99614

The

The true place of the Sun		19.24621
Eccentrick place of the Moon		19.24625
True motion of Latitude		8.80745
The Reduction	*Subtract*	0.03536
The quotient		.06298
So the true Conjunction		.27 22.05912
Equation of time	*Subtract*	.09970
The apparent time of the ☉		.27 21.95942

CHAP. 29.

To find the Parallaxes of Longitude and Latitude.

BY the rules delivered in the former part, find at the true Conjuction on the Midheaven, with its altitude and the Meridian angle.

Example.

The Suns place	♈ 19.246
The Suns Right Ascension	17.749
Time in Degrees	329.391
Right Ascension of Midheaven	347.140
Midheaven	♐ 16.012
Meridian angle	67,078
Declination of Midheaven	5.532
Altitude of the Equator at *London*	38.467
Altitude of Midheaven	32.834

2 The angle of the Ecliptique and Horizon, or altitude of the Nonagesime degree, and his distance from the Midheaven is thus found, by the 17 Chapter of the first part.

As the Radius		
To the sine of the Meridian angle	67.07	9.9642509
So is Cosine of the Altitude of M C	32.83	9.9244255
To the Cosine of the Angle, &c.	39.30	9.8886764
Then as Radius		
To the Cosine of the Meridian angle	67.07	9.5906259
So is cotang. of the altitude of the M. C.	32.83	10.1903074
To the tang. of the distance of the M. C. from the Nonagesime degree	16.02	9.7809333

This M C falling betweene *Capricorn* and *Cancer* this distance is to be added to the Midheaven ♐ 16.02

And the Nonagesime degree will be in ♈ 17.14

3 Find

3 Find the Node Aſcendent and ſubtract it from the Nonageſime degree, with the remainder enter the Table of the Moones latitude, which if North adde to the angle of the Ecliptique and Horizon; if South ſubtract it from it, ſo have you the altitude of the Nonageſime degree of the Moones orbe.

Example.

The Node Aſcendent	*Subt.*	10.439
The Nonageſime degree		17.140
There reſts		6.701
Which gives the Moones Latitude	*Adde*	.570
The angle of the Eclipticke and Horizon		39.300
Altitude of the Nonageſime degree of the Moones orbe		39.870

4 Take the diſtance of the Sun from the Nonageſime degree, which in our Example of the true Conjunction is 2 d. 10.

5 Out of the table of Horizontall parallaxes, take the Horizontall Parallax of the Sun and Moon, the difference of them is the Horizantall parallax of the Moon from the Sun.

Example.

The Horizontall parallax of the Sun is	.03912
The Horizontall parallax of the Moon	.99396
Horizontall parallax of the Moon from the Sun	.95484

6 Adde the Logarithme of the Horizontall parallax of the Moon from the Sun, the ſine of the Altitude of the Moones orbe, and the ſine of the diſtance of the Sun from the Nonageſime, their ſumme ſubtracting twice Radius, is the Logarithme of the parallax of longitude.

Example.

Horizontall parallax of the Moon from the Sun	95484	1.9799306
Altitude of Nonageſime in the Moones orbe, ſine	39.87	9.8068904
Diſtance of the Sun from the Nonageſime, ſine	2.10	8.5639994
Parallax of longitude 02243		2.3508204

Here note that whenſoever the Suns place is leſſe then the Nonageſime degree, the Parallax of Longitude, makes the luminaries appeare more weſt than the truth, and in the occidentall Quadrant, when more then in the orientall.

7 Adde the Logarithme of the Horizontall parallax of the Moon from the Sun to the Coſine of the Nonageſime in the Moones orb; the ſumme rejecting Radius is the Logarithme of the parallax of Latitude.

Example.

Horizontall parallax of the Moon from the Sun	9.54854	1.9799308
Altitude of Nonag. in the Moones ord, Cosine	39.87	9.8815089
Parallax of latitude	0.73284	1.8614295

CHAP. 30.

To find the visible motion of the Moon from the Sun for any time assigned.

AT the beginning and end of the time proposed find the parallax of the Moone from the Sun in Longitude, and then observe these rules.

1 If during all the time proposed, the luminaries be in the orientall quadrant, and the parallax of longitude increase or be greater at the end of the time given then at the beginning, adde the differences of the two parallaxes of longitude unto the true motion of the Moone from the Sun agreeing to the time given, or if it decrease, subtract it and you have what you desire.

2 If during all the time the luminaries be in the occidentall quadrant, and the parallax of longitude increase, subtract the said difference from the true motion, if it decrease, adde it, and you have the visible motion.

3 If at the beginning of the time the luminaries be in the orientall quadrant, and at the ending in the occidentall, subtract the said difference from the true motion, and you have the visible motion during that time.

Example.

Let it be proposed to find the visible motion of the Moon from the Sun, for one halfe hour before the true Conjunction.

In our Example, the true halfe hourly motion is	.28070
Parallax of Longitude at the beginning	.07628
Parallax of Longitude at the end	.02243
Their difference is *Subtract*	.05385
from the true halfe hourly motion *Rests*	.22658

the visible halfe hourly motion before the Conjunction.

CHAP. 31.

To finde the time of the visible Conjunction of the Sun and Moon.

USe this Analogie, As the apparent motion in any time assigned (found by the former Chapter) is to the time assigned; so is the Parallax of longitude at the true Conjunction to the difference in time between the true and visible Conjunction.

This

This difference in the orientall quadrant must be subtracted from the time of the true Conjunction, in the occidentall quadrant added thereto; so have you the visible Conjunction.

Example.

As the visible halfe hourly motion	22685	50. 00.	0.644262
Is to the time assigned 50′			1.698970
So parallax longitude 02243			2.350829
To the difference betwixt the true and visible Conjunction 04943			2.694061
The true Conjunction		27	21.95943
Difference *subtract*			.04943
The visible Conjunction		27	21.99999

At this time finde out the true distance of the Moon from the Sun, as also the parallax of longitude, if they agree it is a signe that the visible Conjunction is truly found, otherwise repeat the former worke till there be a concurrance. *Example*

At the visible Conjunction, *March*	27	21.90999
The true distance of the Moone from the Sun		.02847
The Parallax of Longitude		.02775
Their difference		.00072

which being so small sheweth that the visible Conjunction is precisely enough found.

CHAP. 32.

To finde the visible Latitude of the Moon, at the time of the visible Conjunction.

IN these Northerne regions which we inhabit, the parallax of latitude allwayes makes the Moon to appeare more South then indeed she is to find the visible latitude therefore observe these rules.

1 At the time of the visible conjunction find out the true latitude of the Moon thus. If the Eclipse happen in the orientall quadrant, adde the parallax of longitude to the motion of the Sun, agreeing to the difference between the true and visible Conjunction, and the summe subtract from the true motion of latitude at the time of the true Conjunction; or if the Eclipse happen in the occidentall quadrant adde the said summe thereto, and you have the true motion of latitude at the visible Conjunction, by which as formerly taught, finde out the true Latitude of the Moone.

Example.

Motion of the Sun agreeing to 04943	.00108
Parallax of Longitude at visible ☌	.02775
The Summ *Subt.*	.02977
Motion of Latitude at true ☌	8.80745
Motion of Latitude at visible ☌	8.77768
True Latitude at visible ☌ *North*	.75808

At the same time find the parallax of latitude, and compare it with the true latitude. If the latitude be South, adde them together, the summe is the South visible latitude of the Moone, but if North, subtract the lesse from the greater; there remaines the visible latitude of the Moon, which shall be North when the latitude is greater then the parallax, otherwise South.

Example.

The true latitude of the Moon, *North*	0.75808
Parallax of Latitude	0.73633
The visible latitude *North*	.02175

CHAP. 33.

To find the quantity of a Solar Eclipse.

THis differs very little from that in the 24 Chapter, for finding the quantity of a lunar Eclipse, for if with their meane Anomalies you enter the Table, and thence take out the Semidiameter of the Sun and Moone, and adde them together; and from the summe subduct the visible latitude of the Moone, at the visible Conjunction, there rests the Scruples of the Suns body deficient, which as in the Moon, so here in the Sun convert into digits.

Example.

Semidiameter of the Sun	.27386
Semidiameter of the Moon	.27815
Summe of the Semidiameters	.55201
Visible latitude *Subtracted*	.02175
Scruples deficient	.53026
So the digits eclipsed	11.61500

CHAP. 34.

To find the beginning and ending of the Suns Eclipse.

BY the visible latitude of the Moon, and the summe of the Semidiameters of the Sun and Moon, find the Scruples of incidence, as in the Moones Eclipse Chap. 25.

2 For one hour before the visible Conjunction, find by the 30 Chapter the visible hourly motion of the Moon from the Sun, by which divide the Scruples of incidence, the quotient is the time of incidence, which subtracted from the time of the visible Conjunction, leaves the beginning of the Eclipse

3 For one hour after the visible Conjunction, finde the visible hourly motion of the Moon from the Sun, by which divide the Scruples of incidence, the quotient is the time of Repletion: which added to the time of the visible Conjunction, gives the end of the Eclipse.

Example.

Summe of the Semidiameters		.55208
Visible latitude		.02175
Scruples of Incidence		.55158
At 1 ho. before the visible ☌	*March* 27	20.90999
Parallax of longitude Orient.		.13209
True hourly motion of the Moon from the Sun		.56140
Visible hourly motion		.45174
Time of incidence		1.22150
Beginning of the Eclipse	*March* 27	20.68849
At 1 ho. after the visible ☌	27	22.90999
Parallax of longitude Occid.		.10119
Visible hourly motion of the Moone from the Sun		.48796
Time of repletion		1 h. .13030
End of the Eclipse	27	23.04029
The whole duration		2.35180

CHAP. 35.

To find the Visible latitude of the Moon at the beginning and end of the Suns Eclipse.

FOr the beginning, adde to the minutes of Incidence the motion of the Sun agreeing to the time of Incidence, and the summe subtract from the true motion of latitude at the time of the visible Synod, so have you the true motion of latitude at the beginning, by which find the true latitude, and by these according to the second rule of the 32 Chapter, may be had the visible latitude.

Example.

Example.

The Scruples of Incidence	.55158
Motion of the Sun answering to the time	.03016
The Summe *subt.*	.60174
Motion of latitude at visible ☌	8.77768
Motion of latitude at beginning	8.17594
True latitude *North*	.70648
Parallax of latitude	.82004
Visible latitude *South*	.11353

2 For the end, adde to the minutes of incidence the motion of the Sun agreeing to the time of repletion and the sum adde to the true motion of latitude at the time of the visible Conjunction; so have you the true motion of latitude at the end; by which proceed as before, to find the visible Latitude.

Example.

Scruples of Incidence	.55158
Motion of the Sun agreeing to the time of repl.	.04642
The Summe *Adde*	.59800
Motion of Latitude at the visible ☌	8.77768
Motion of Latitude at the ending	9.37568
True Latitude *North*	.80925
Parallax of Latitude	.65218
Visible Latitude *North*	.15707

CHAP. 36.

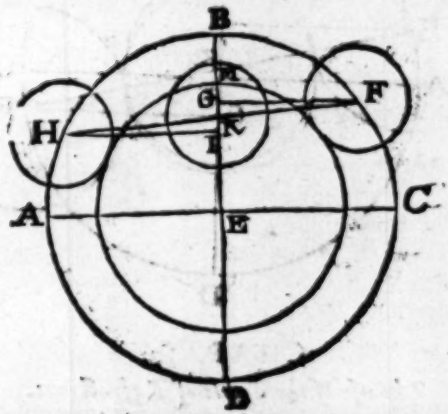
To Delineate the Eclipses of the Sun and Moon.

FOr the Moon draw the lines A C and B D to interſect one another at right angles in E, which point of interſection is the place of the Ecliptique where the Eclipſe happens: upon which as a Center draw the Peripherie A B C D, of the quantity of the ſumme of the Semidiameters of the Moon and the earths ſhadow (which may be done by helpe of a Scale or Sector of equal diviſions) alſo to the quantity of the Semidiameter of the earths ſhadow, draw upon the ſame center another Peripherie.

Then becauſe the Moones Eclipſe begins on the eaſt part of her body, you muſt upon the weſt ſide of your plane, note downe the latitude of the Moon

Moon in the arch B C D, which here represents the west part, and may be thus done. From E upon the line B D prick out the latitude at the beginning; towards B, if the Latitude be North, towards D if South, and it terminates at G, from which draw a parallel to A C, and in the arch B C it marks out F. Also for the end of the Eclipse proceed in like manner on the other side, and you have the latitude terminated at I, and the parallel falling at H. Then draw a line between F and H and where it intersects B D marke it with K. Lastly, upon the centers F, K and H, draw three equal circles, having for Radius the Semidiameter of the Moone, and the worke is done.

Typus Eclipseos Lunæ præcitatæ.



Example of the forementioned Eclipse of the Moon March 15. 1652.

Summe of the Semidiameters E B	.97385
Semidiameter of shadow E M	.70954
Initial latitude of the Moon E G, *North*	.59223
Final latitude of the Moon E I *North*	.43746
Semidiameter of the Moon M B	.26431

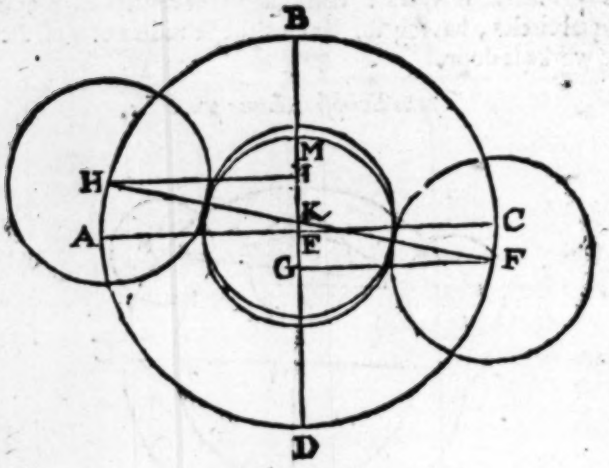
2 For the Eclipse of the Sun, it differs nothing at all from this of the Moon, but onely that instead of the Semidiameter of the shadow of the earth you use the Semidiameter of the Sun; and the visible latitude for the true.

Exa-

Example of the foretold Solar Eclipse March 22. 1652.

Summe of the Semidiameters E B	.53301
Semidiameter of the Sun E M	.27386
Initiall visible latitude E G *South*	.12353
Finall visible latitude E I *North*	.15707
Semidiameter of the Moon M B	.27815

Typus Eclipſeos Solis prædictæ.

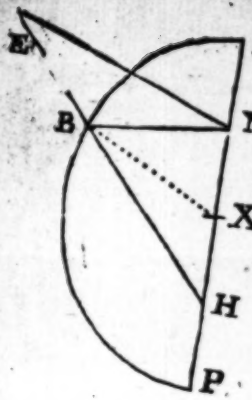


CHAP. 37.

The uſe of the Table of Refractions.

ALthough the Table of Refractions, belongs not to the calaulation of theſe Tables, yet will it not be amiſſe to ſhew its uſe in comparing of obſervation with calculation. Know then that Refraction, cauſeth the ſtars to appeare higher then really they are. Therefore with an obſerved altitude enter this Table and take out the Refraction, which ſubtract from the obſerved altitude, and you have the true altitude, or having the true altitude, the apparent is found by adding the Refraction thereto.

FINIS.



This Scheame hath particular relation to page 103, and is there printed in moſt Copies, but in ſome Copies there is another Scheame placed inſtead thereof, the Reader is therefore deſired (where it is wanting) to inſert it.

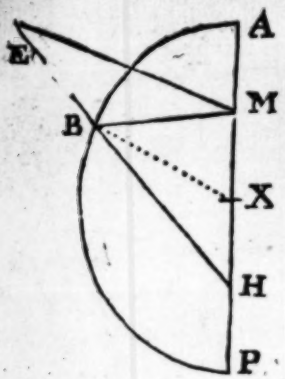
Errata.

Page 7. line the laſt, for the North read C the North.
8. line 10 read or the arch H B.
21. line 20 for elſe of that, read elſe that.
29. line 39 for E D 38 read E D 30.
37. line 23 for paralleltical read parallactical.
76. line 14 for plane parallel read plane is parallel.

In the Tables.

Page 26 againſt degree 11 for 0,38836 read 0,38336.
27 againſt degree 90 for 5,0201387 read 5,0001387.
27 againſt degree 117 for 4,9961795 read 4,9965795.
34 againſt degree 56 for 3,04 &c. read 4,04 &c.
35 againſt degree 87 for 5,0010809 read 5,0018089.
35 againſt degree 119 for 4,163 &c. read 4,463 &c.
36 againſt degree 132 for 3,874 &c. read 824 &c.
36 againſt degree 139 for 3,38920 read 3,38902.
36 againſt degree 126 for 4,9895915 read 4,9895925.
36 againſt degree 179 for 0,69126 read 0,09126.
86 In the Title, for A Table of Declinations, read A Table of Right Aſcenſions.

Let this leafe be folded in at page 168, whic



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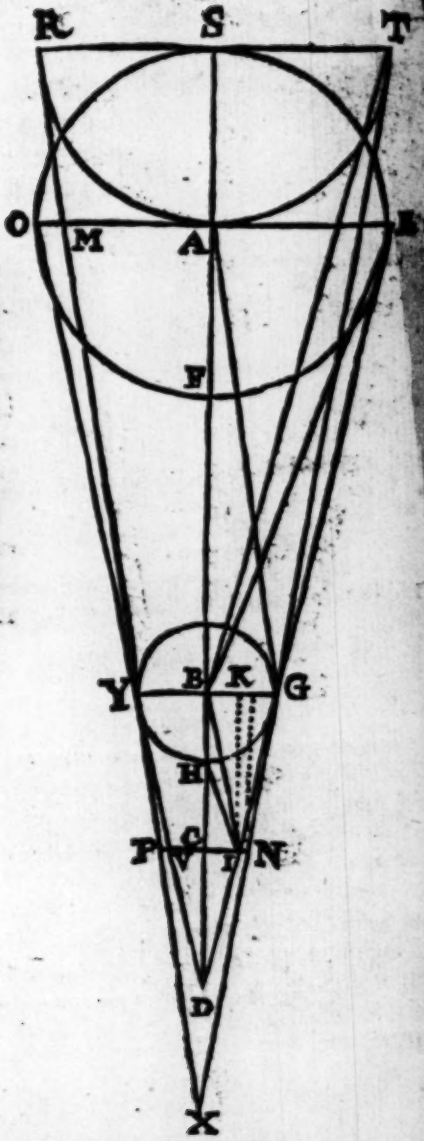
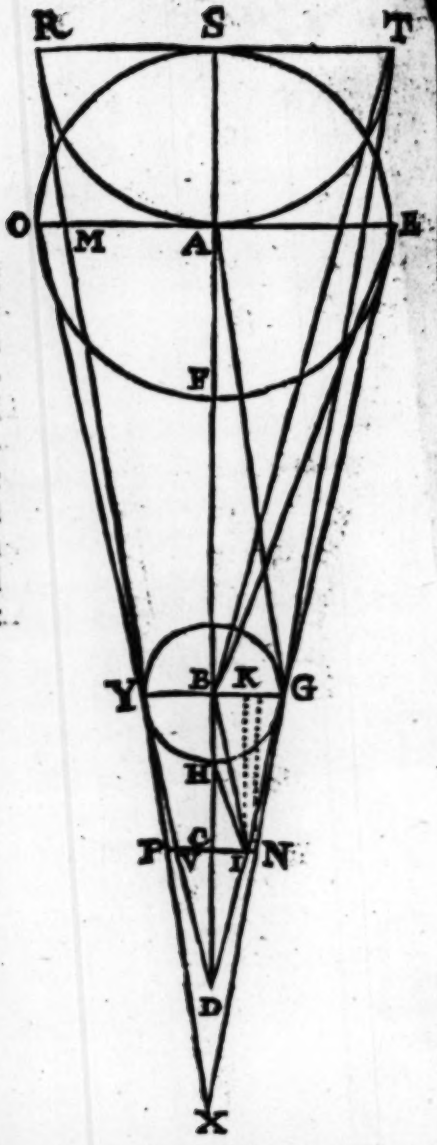
This Diagram having particular relation to the 18 Chapter of the ſecond Book, will be in uſe for diverſe leaves together, I thought it therefore convenient, to place it ſo that when the Book is opened in any part, the Dirgram might be in ſight, and have therefore ordered it to be folded in.



which is between the ſecond and third Books.

This Diagram having particular relation to the 18 Chapter of the second Book, will be in use for diverse leaves together, I thought it therefore convenient, to place it so that when the Book is opened in any part, the Dirgram might be in sight, and have therefore ordered it to be folded in.



is between the second and third Books.

Astronomia BRITANNICA

The third Part:

Exhibiting Tables, for the converting of *Sexagenary* Numbers into *Decimal* and the contrary, for *Astronomical Chronologie* with the *Ecclesiastical Computation*, and the *Calculation* of the places of the *Planets*, *Eclipses* of the *Luminaries* and *Doctrine* of the *Sphere*.

LONDON.
Printed by R. and W. Leybourne *Anno Domini* 1656.

A view of the more notable Epochæ.

Epochæ	Yeares of the Julian Period	Moneths
The Iulian Period	1	*Januar.* 1
Creation of the World	765	*Januar.* 1
Æra of the Olympiades	3938	*July* 8
The building of Rome	3961	*April* 21
Epochæ of Nabonassor	3667	*Febru.* 26
The beginning of Meton's *Circle*	4281	*June* 26
The beginning of the Periods of Calippus	4384	*June* 28
The Death of Alexander *the great*	4390	*Nove.* 12
Æra of the Chaldees	4403	*Octob.* 15
The Æra of Dyonisius	4429	*Marc.* 25
The beginning of the Christian Æra falls in the 4713 *Yeare of the* Julian *period compleat.*	Yeares of Christ	Moneth.
The Diocletian *Æra*	284	*Augu.* 29
The Turkish *Æra or Hegyra*	622	*July* 16
The Persian *Æra from* Jesdagird	632	*June* 16
The Æra of the Persian Sultan	1079	*Marc.* 14

Dayes in yeares of the

Julian accompt				*Egypt. and Persian accompt*			
1	0 0 0	365	2 5 0	1	0 0 0	365	0 0 0
2	0 0 0	730	5 0 0	2	0 0 0	730	0 0
3	0 0 0	1095	7 5 0	3	0 0 0	1095	0 0
4	0 0 0	1461	0 0 0	4	0 0 0	1460	0 0
5	0 0 0	1826	2 5 0	5	0 0 0	1825	0 0 0
6	0 0 0	2191	5 0 0	6	0 0 0	2190	0 0 0
7	0 0 0	2556	7 5 0	7	0 0 0	2555	0 0
8	0 0 0	2922	0 0 0	8	0 0 0	2920	0 0 0
9	0 0 0	3287	2 5 0	9	0 0 0	3285	0 0 0
10	0 0 0	3652	5 0 0	10	0 0 0	3650	0 0 0

Dayes.

Dayes in Moneths of the

Julian Com.	BSS	Egyptian		Persian accompt.	
Januar. 31	1	Thoth	30	Pharvadin	30
Februar. 59	60	Paophi	60	Aripeheſt	60
March 90	91	Athyr	90	Chortat	90
April 120	121	Chaac	120	Tyrma	120
May 151	152	Tybi	150	Mertat	150
June 181	182	Mechir	180	Sachriur	180
July 212	213	Phamenoth	210	Mecherma	210
Auguſt 243	244	Pharmuthi	240	Apanma / Wahak	245
Septem. 273	274	Pachon	270		
Octob. 304	305	Payni	300	Adarma	275
Novem 334	335	Ephephi	330	Dima	305
Decem. 365	366	Meſori	360	Pechmam	335
		Epagomena	365	Aſphander	365

Dayes in Turkiſh or Arabical Years.

1	354	14	.4961	27		9568	
2	709	15	.5315	28		9922	
3	.1063	16	.5670	29		10276	
4	.1417	17	.6024	30	0	10631	0
5	.1772	18	.6378	60	0	21262	0
6	.2126	19	.6733	90	0	31893	0
7	.2480	20	.7087	120	0	42524	0
8	.2835	21	.7442	150	0	53155	0
9	.3189	22	.7796	180	0	63786	0
10	.3543	23	.8150	210	0	74417	
11	.3898	24	.8505	240	0	85048	0
12	.4252	25	.8859	270	0	95679	0
13	.4607	26	.9213	300	0	106310	0

Dayes in Turkiſh Moneths.

Muharram	30	Sababen	236
Sephar	59	Ramadhan	266
Rabie I	89	Scheval	295
Rabie II	118	Dulkadati	325
Giumadi I	148	Dulhajati / Dſilbitiſche, Turc.	354
Giumadi II	177	In anno abundanti	355
Regeb	207		

A Table shewing the Dominical Letter in both accompts.

Years of our Lord	Cycle of the Sun	Julian accom	Greg. accom
1644	1	G F	E D
1645	2	E	A
1646	3	D	G
1647	4	C	F
1648	5	B A	E D
1649	6	G	C
1650	7	F	B
1651	8	E	A
1652	9	D C	G F
1653	10	B	E
1654	11	A	D
1655	12	G	C
1656	13	F E	B A
1657	14	D	G
1658	15	C	F
1659	16	B	E
1660	17	A G	D C
1661	18	F	B
1662	19	E	A
1663	20	D	G
1664	21	C B	F E
1665	22	A	D
1666	23	G	C
1667	24	F	B
1668	25	E D	A G
1669	26	C	F
1670	27	B	E
1671	28	A	D

A Table shewing the Epact in both accompts.

Years o our Lord	Gold Num.	Epac. Julia.	Epact Greg.
1653	1	11	1
1654	2	22	12
1655	3	3	23
1656	4	14	4
1657	5	25	15
1658	6	6	26
1659	7	17	7
1660	8	28	18
1661	9	9	29
1662	10	20	10
1663	11	1	21
1664	12	12	2
1665	13	23	13
1666	14	4	24
1667	15	15	5
1668	16	26	16
1669	17	7	27
1670	18	18	8
1671	19	29	19

The Anticipation of the Gregorian Kalender.

A 5 Oct.	10	1582	d.	A.D.
	11	1700	17	2500
A 24 Fe.	12	1800	18	2600
	13	1900	19	2700
	14	2100	20	2900
	15	2200	21	3000
	16	2300	22	3100

A Table of moveable Feasts in both accompts.

Ep	DLxx	L	Ash.	East.	Asce.	Pen.	Corp.	Advent	Sun.		
25	D	Jan18	Feb. 3	Feb. 4	March 23	Ap. 30	May 12	May	29	Nove.	D	22
24	E	19	2	5	23	May 1	11	22	30		E	21
23	F	20	3	6	24	2	12	23	1	Decem	F	20
22	G	21	4	7	25	4	13	24	2		G	19
21	A	22	5	8	26	4	14	25	3		A	18
20	B	23	6	9	27	5	15	26	27	Nove.	B	17
19	C	24	7	10	28	6	16	27	28		C	16
18	D	25	8	11	29	7	17	28	29		D	15
17	E	26	9	12	30	8	18	29	30		E	14
16	F	27	10	13	31	9	19	30	1	Decem	F	13
15	G	28	11	14	Ap. 1	10	20	31	2		G	12
34	A	29	12	15	2	11	21	June 1	3		A	11
13	B	30	13	16	3	12	22	2	27	Nove.	B	10
12	C	31	14	17	4	13	23	3	28		C	9
11	D	Feb. 1	15	18	5	14	24	4	29		D	8
10	E	2	16	19	6	15	25	5	30		E	7
9	F	3	17	20	7	16	26	6	1	Decem	F	6
8	G	4	18	21	8	17	27	7	2		G	5
7	A	5	19	22	9	18	28	8	3		A	4
6	B	6	20	23	10	19	29	9	27	Nove.	B	3
5	C	7	21	24	11	20	30	10	28		C	2
4	D	8	22	25	12	21	31	11	29		D	1
3	E	9	23	26	13	22	June 1	12	30		E	*
2	F	10	24	27	14	23	2	13	1	Decem	F	29
1	G	11	25	28	15	24	3	14	2		G	28
*	A	12	26	Mar. 1	16	25	4	15	3		A	27
29	B	13	27	2	17	26	5	16	27	Nove.	B	26
28	C	14	28	3	18	27	6	17	28		C	24
*	D	15	Mar. 1	4	19	28	7	18	29		D	*
*	E	16	2	5	20	29	8	19	30		E	*
*	F	17	3	6	21	30	9	20	1	Decem	F	*
*	G	18	4	7	22	31	10	21	2		G	*
*	A	19	5	8	23	June 1	11	22	3		A	*
27	B	20	6	9	24	2	12	23	27	Nove.	B	*
26	C	21	7	10	25	3	13	24	28		C	23

A Table of Fixed Feasts

	January	February	March	April	May	June
1	Circu. a	Ignat. d	d	g	P.&Ja.b	c
2	b	Pu.P. e	e	Frãde P a	c	Marcel. f
3	c	Blasius f	f	b	Inv.cru.d	g
4	d	g	Lucius g	c	e	a
5	Telesph.e	Agath. a	a	d	f	b
6	Epiphã.f	Doroth.b	b	e	Jo.p.latg	c
7	g	c	c	f	a	d
8	a	d	d	g	Ap.SM.b	e
9	b	Apollo. e	40Mar. e	a	c	Primus f
10	c	f	f	b	d	g
11	Hygin. d	g	g	Leo Pa.c	e	Barnab.a
12	e	a	Gregor. a	d	f	b
13	f	b	b	e	g	Anton. c
14	Hilari. g	Valent. c	c	T.V.M.f	Bonifa. a	Basil. d
15	Paul Er.a	Fa.& J.d	d	g	b	e
16	Marcel. b	e	e	a	Ubald c	f
17	Anton. c	f	f	Anicet. b	d	g
18	Cut.S P d	Simeon g	g	c	e	a
19	e	a	Ios.con.a	d	Prudent.f	Gervas.b
20	Fab.&se f	b	b	e	g	c
21	Agnet. g	c	Benedi. c	f	a	d
22	Vincen. a	d	d	Soter.c. g	b	e
23	b	e	e	George a	c	f
24	Timoth.c	S. Pa.f	f	b	d	S.Io.Bg
25	Con.P. d	g	An.Pag	S Mar.c	Urban. e	a
26	Policar. e	a	a	d	f	b
27	f	b	b	e	Jo. pap.g	c
28	g	c	c	Vitalis f	a	d
29	a		d	Cathar. g	b	Leo e
30	b		e	a	Felix c	Pet.ap.f
31	c		f		Petrom.d	g

A Table of Fixed Feasts.

	July		August		Septemb		October		Novem.		Decem.	
1		g	Lammasc		Ægyd.	f	Remigi.a		All Sa.d			f
2	Visi M.	a		d		g		b	All ſou.	e	Bibinia	g
3		b		e		a		c		f		a
4		c		f		b	Franciſ.d		Vital.	g	Barbara	b
5		d	Ded.M.	g		c		e		a		c
6		e	Transf.	a		d		f		b		d
7		f		b		e	Marc.p.	g		c	Ambro.	e
8		g		c	Na. V.	f		a		d	Conc.M	f
9		a		d		g	Dionyſ.	b		e		g
10	7 fratr.	b	Laurence			a		c	Tryph.	f		a
11		c		f		b		d	Martin	g		b
12	Nabor	d		g		c		e		a		c
13		e		a		d		f		b	Lucia	d
14	Bonav.	f		b	Exal.cr.	e	Calliſt.	g		c		e
15		g	Aſſ. M.	c		f		a		d	Euſebius	f
16		a		d	Cornel.	g		b		e		g
17	Alexius	b		e		a		c	Gregor.	f		a
18		c		f		b	Lucos	d		g		b
19		d		g		c		e	Pontia.	a		c
20	Margar.	e	Bernar.	a		d		f		b		d
21		f		b	Mat. E	e	Hilariõ.	g	Ob.Ma.	c	Tho. a.	e
22	M Mag.	g		c		f		a		d		f
23		a		d	Linus	g		b		e		g
24		b	Bart.a.	c		a		c		f		a
25	Jam.a.	c		f		b	Chryſa.	d	Cathar.	g	Na. C.	b
26		d		g	Cyprian	c		e		a	Steph.	c
27		e		a		d		f		b	Joh. E.	d
28		f	Auguſt.	b		e	Si. Ju.	g		c	Innoc.	e
29	Martha.	g	Decoll.	c	Mich. A	f		a		d	T. Cant.	f
30		a		d	Hieron.	g		b	And.a.	e		g
31		b		e				c			Silveſt.	a

A Catalogue of ſome famous places with their Latitude, and diſtance in Longitude from the Meridian of *London*.

The Names of the Places.	Difference of Meridia. H. Parts		Height of the Pole D. Parts
Aberden in Scotland	S	0.11667	58.66667
Adrionaplis in Thrace	A	2.06667	43.33333
Agcia in Hungarie	A	1.35000	47.93333
Alba Julia in Tranſylvania	A	1.53333	47.00000
Alepus in Syria	A	2.41667	37.33333
Alexandria in Egypt	A	2.18333	30.96667
Algiers in Africa	A	0.38333	35.60000
Amſterdam in Holland	A	0.35000	52.41667
Antwerp in Brabant	A	0.28333	51.20000
Aracta in Chaldæa	A	3.30000	36.00000
Arbela in Aſſyria	A	3.76667	37.25000
Aſtracan upon Volgo in Tartaria	A	3.96667	50.00000
Athens in Greece	A	1.86667	37.00000
Bamberge in Franconie	A	0.75000	49.61667
Bononia in Italy	A	0.71667	43.81677
Bruduſium in Calabria	A	1.28333	49.53333
Bulgaria in Tartaria	A	4.03333	56.00000
Burgos in Spaine	S	0.25000	42.66667
Calecutum in India	A	5.83333	11.50000
Cambridge in England	A	0.03333	52.33333
Carthage in Africa	A	0.68333	34.83333
Caſan in Tartaria	A	4.00000	58.00000
Caſſels in Heſſia	A	0.73333	51.31667
Cair grand in Egypt	A	2.26667	29.83333
Chalcedon	A	2.33333	43.25000
Cheſter in England	S	0.16667	53.26667
Cochin in India	A	5 90000	9.90000
Cola in Lapland	A	2.30000	69.40000
Colberg in Pomerania	A	1.03333	54.46667
Compoſtella in Spaine	S	0.63333	43.00000
Conſtantinople in Thrace	A	2.30000	43.00000
Conymbre in Luſitania	S	0.58333	40.25000
Cracow in Poland	A	1.35000	49.96667
Crim of Precopenſis in Tartary	A	2.70000	47.83333
Damaſcus in Syria	A	3.26667	34.00000
Dantzik of Boruſſia in Poland	A	1.13333	54.38333
Doüay in Arteſia	A	0.23333	50.40000
Edenburgh in Scotland	S	0.03333	55.95000
Epidaurus in Peloponneſis	A	1.86667	35.50000
Famaguſta in Cyprus	A	2.95000	35.00000

The Names of the Places.		Difference of Meridian. H. Parts	Height of the Pole D. Parts
Francford upon Odar	A	0.55000	50.21667
Francford upon Mæne	A	0.96667	52.33333
Fruenburg in Borussia	A	1.36667	54.36667
Gratium in Stiria	A	1.06667	47.03333
Groyning in Frizia	A	0.43333	53.25000
Hamburg in Holsatia	A	0.66667	53.71667
Haphnia in Denmarke	A	0.81667	55.71667
Lipsia in Misnia	A	0.81667	51.40000
Liverpoole in England	S	0.16667	53.36667
LONDON in England		0.00000	51.53333
Lovaine in Brabant		0.33333	50.83333
Leyden	A	0.31667	52.18333
Middleburg in Zeland	A	0.26667	51.50000
Manchester in England	A	0.15000	53.40000
Naples in Italy	S	0.96667	40.70000
Nicomedia in Bythynia	A	2.38333	42.50000
Nidrosia in Norway	A	0.56667	63.20000
Newcastle in England	A	0.01667	55.95000
Norimberg in Germany	S	0.76667	49.43333
Orleans in France	A	0.00000	48.23333
Oxford in England		0.05000	51.06667
Paris in France	S	0.13333	48.65000
corrected by *Bullialdus*	A	0.03333	48.85000
Patavium in Liburnia	A	0.76667	45.10000
Prague in Bohemia	A	0.93333	50.10000
Rhodes an Island	A	3.43333	36.00000
Rochell in Aquitain	A	0.06667	45.81667
Rochester in England	S	0.03333	51.50000
Rome in Italie	A	0.83333	42.03333
Roan in Normandie	A	0.00000	49.33333
Smarcanda in Tartaria	A	5.66667	41.00000
Scutara in Dalmatia	A	1.43333	42.38333
Sevill in Spaine	S	0.36667	37.33333
Spahani in Persia	A	4.33333	31.50000
Stetin in Pomerania	A	0.36667	53.60000
Syracusa in Sicilie	A	1.08333	36.83333
Tolledo in Spaine	S	0.28333	39.20000
Tubing Wittenburg	A	0.63333	48.56667
Valence in Spaine	A	0.10000	39.50000
Ulme in Suevia	A	0.70000	48.40000
Uraniburge in Denmark	A	0.83338	55.91667
Yorke in England	S	0.05000	54.03333

A Table to convert Sexagenary minutes,

′ ″	P
0	00
.36	01
1.12	02
1.48	03
2.24	04
3. 0	05
3.36	06
4.12	07
4.48	08
5.24	09
6. 0	10
6.36	11
7.12	12
7.48	13
8.24	14
9. 0	15
9.36	16
10.12	17
10.48	18
11.24	19
12. 0	20
12.36	21
13.12	22
13.48	23
14.24	24
15. 0	25
15.36	26
16.12	27
16.48	28
17.24	29
18. 0	30
18.36	31
19.12	32
19.48	33
20.24	34
21. 0	35
21.36	36
22.12	37
22.48	38
23.24	39
24. 0	40
24.36	41
25.12	42
25.48	43
26.24	44
27. 0	45
27.36	46
28.12	47
28.48	48
29.24	49
30. 0	50
30.36	51
31.12	52
31.48	53
32.24	54
33. 0	55
33.36	56
34.12	57
34.48	58
35.24	59
36. 0	60
36.36	61
37.12	62
37.48	63
38.24	64
39. 0	65
39.36	66
40.12	67
40.48	68
41.24	69
42. 0	70
42.36	71
43.12	72
43.48	73
44.24	74
45. 0	75
45.36	76
46.12	77
4648	78
4724	79
48. 0	80
48.36	81
49.12	82
49.48	83
50.24	84
51. 0	85
51.36	86
52.12	87
52.48	88
53.24	89
54. 0	90
54.36	91
55.12	92
55.48	93
56.24	94
57. 0	95
57.36	96
58.12	97
58.48	98
59.24	99
60. 0	100

and ſeconds into Decimals and the contrary

0	36	12	48	24	00000000
1	37	13	49	25	02777778
2	38	14	50	26	05555555
3	39	15	51	27	08333333
4	40	16	52	28	11111111
5	41	17	53	29	13888889
6	42	18	54	30	16666667
7	43	19	55	31	19444444
8	44	20	56	32	22222222
9	45	21	57	33	25000000
10	46	22	58	34	27777778
11	47	23	59	35	30555555
12	48	24	1.00	36	33333333
13	49	25	1	37	36111111
14	50	26	2	38	38888889
15	51	27	3	39	41666667
16	52	28	4	40	44444444
17	53	29	5	41	47222222
18	54	30	6	42	50000000
19	55	31	7	43	52777778
20	56	32	8	44	55555555
21	57	33	9	45	58333333
22	58	34	10	46	61111111
23	59	35	11	47	63888889
24	1.00	36	12	48	66666667
25	1	37	13	49	69444444
26	2	38	14	50	72222222
27	3	39	15	51	75000000
28	4	40	16	52	77777778
29	5	41	17	53	80555555
30	6	42	18	54	83333333
31	7	43	19	55	86111111
32	8	44	20	56	88888889
33	9	45	21	57	91666667
34	10	46	22	58	94444444
35	11	47	23	59	97222222

	Thirds	Fourths	Fifths
1	0000046296	0000000772	0000000013
2	92593	1573	26
3	138889	2315	39
4	185185	3046	51
5	231481	3858	64
6	277778	4630	77
7	324074	5401	90
8	370370	6173	103
9	416667	6944	116
10	462963	7716	129
11	509259	8488	141
12	555556	9259	154
13	601852	100 1	167
14	648148	10802	180
15	694444	11574	193
16	740741	12345	206
17	787037	13117	219
18	833333	13889	232
19	879630	14660	245
20	925926	15432	258
21	972222	16204	270
22	1018518	16975	283
23	1064814	17747	296
24	1111111	18518	309
25	1157407	19290	322
26	1203703	20062	335
27	1250000	20833	348
78	1296296	21605	360
29	1342592	22376	373
30	1388888	23148	386

	Towds	Fourths	Fifths
31	0001435184	0000023920	0000000399
32	1481481	24691	412
33	1527777	25463	425
34	1574073	26234	438
35	1620370	27006	450
36	1666666	27778	463
37	1712963	28549	476
38	1759259	29321	489
39	1805556	30092	502
40	1851852	30864	515
41	1898148	31636	527
42	1944444	32407	540
43	1990740	33179	553
44	2037037	33950	566
45	2083333	34722	579
46	2129629	35494	592
47	2175925	36265	605
48	2222222	37037	618
49	2268518	37808	630
50	2314815	38580	643
51	2361111	39352	656
52	2407407	40123	669
53	2453703	40895	682
54	2500000	41666	694
55	2546296	42438	707
56	2592502	43210	720
57	2638889	43981	733
58	2685185	44753	746
59	2731481	45524	759
60	2777778	46296	772

A Table to convert the houres and minutes.

H. M.	P
0	0
2.24	1
4.48	2
7.12	3
9.36	4
12.00	5
14.24	6
16.48	7
19.12	8
21.36	9

0	24	48	12	36	000000000
1	25	49	13	37	006944444
2	26	50	14	38	013888889
3	27	51	15	39	020833333
4	28	52	16	40	027777778
5	29	53	17	41	034722222
6	30	54	18	42	041666667
7	31	55	19	43	048611111
8	32	56	20	44	055555555
9	33	57	21	45	062500000
10	34	58	22	46	069444444
11	35	59	23	47	076388889
12	36	5.17	24	48	083333333
13	37	1	25	49	090277778
14	38	2	26	50	097222222
15	39	3	27	51	104166667
16	40	4	28	52	111111111
17	41	5	29	53	118055553
18	42	6	30	54	125000000
19	43	7	31	55	131944444
20	44	8	32	56	138888889
21	45	9	33	57	145833333
22	46	10	34	58	152777778
23	47	11	35	59	159722222
24	48	12	36	10.22	166666667
25	49	13	37	1	173611111
26	50	14	38	2	180555555
27	51	15	39	3	187500000
28	52	16	40	4	194444444
29	53	17	41	5	201388889
30	54	18	42	6	208333333
31	55	19	43	7	215277778
32	56	20	44	8	222222222
33	57	21	45	9	229166667
34	58	22	46	10	236111111
35	59	23	47	11	243055555
36	3.15	24	48	12	250200000

of a day into Decimals and the contrary.

0	24	48	12	36	
37	1	25	49	13	256044444
38	2	26	50	14	26:888889
39	3	27	51	15	270833333
40	4	28	52	16	277777778
41	5	29	53	17	284722222
42	6	30	54	18	291666667
43	7	31	55	19	298611111
44	8	32	56	20	305555555
45	9	33	57	21	312500000
46	10	34	58	22	319444444
47	11	35	59	23	326388889
48	12	36	8.20	24	333333333
49	13	37	1	25	340277778
50	14	38	2	26	347222222
51	15	39	3	27	354166667
52	16	40	4	28	361111111
53	17	41	5	29	368055555
54	18	42	6	30	375000000
55	19	43	7	31	381944444
56	20	44	8	32	388888889
57	21	45	9	33	395833333
58	22	46	10	34	402777778
59	23	47	11	35	409722222
1.1	24	48	12	36	416666667
1	25	49	13	37	423611111
2	26	50	14	38	430555555
3	27	51	15	39	437500000
4	28	52	16	40	444444444
5	29	53	17	41	451388889
6	30	54	18	42	458333333
7	31	55	19	43	465277778
8	32	56	20	44	472222222
9	33	57	21	45	479166667
10	34	58	22	46	486111111
11	35	59	23	47	493055555
12	36	6.18	24	48	500000000

A Table to convert the houre and minutes.

0	24	48	12	36	
13	37	1	25	49	506944444
14	38	2	26	50	513888889
15	39	3	27	51	520833333
16	40	4	28	52	527777778
17	41	5	29	53	534722222
18	42	6	30	54	541666667
19	43	7	31	55	548911111
20	44	8	32	56	555555555
21	45	9	33	57	562500000
22	46	10	34	58	569444444
23	47	11	35	59	576388889
24	48	12	36	11. 23	583333333
25	49	13	37	1	590277778
26	50	14	38	2	597222222
27	51	15	39	3	604166667
28	52	16	40	4	611111111
29	53	17	41	5	618055555
30	54	18	42	6	625000000
31	55	19	43	7	631944444
32	56	20	44	8	638888889
33	57	21	45	9	645833333
34	58	22	46	10	652777778
35	59	23	47	11	659722222
36	4. 16	24	48	12	666666667
37	1	25	49	13	673611111
38	2	26	50	14	680555555
39	3	27	51	15	687500000
40	4	28	52	16	694444444
41	5	29	53	17	701388889
42	6	30	54	18	708333333
43	7	31	55	19	715277778
44	8	32	56	20	722222222
45	9	33	57	21	729166667
46	10	34	58	22	736111111
47	11	35	59	23	743055555
48	12	36	9 . 21	24	750000000

of a day into Decimals and the contrary.

0	24	48	12	36	
			1	25	756944444
49	13	37	2	26	763888889
50	14	38	3	27	770833333
51	15	39	4	28	777777778
52	16	40	5	29	784722222
53	17	41	6	30	791666667
54	18	42	7	31	798611111
55	19	43	8	32	805555555
56	20	44	9	33	812500000
57	21	45	10	34	819444444
58	22	46	11	35	826388889
59	23	47	12	36	833333333
2. 14	24	48	13	37	840277778
1	25	49	14	38	847222222
2	26	50	15	39	854166667
3	27	51	16	40	861111111
4	28	52	17	41	868055555
5	29	53	18	42	875000000
6	30	54	19	43	881944444
7	31	55	20	44	888888889
8	32	56	21	45	895833333
9	33	57	22	46	902777778
10	34	58	23	47	909722222
11	35	59	24	48	916666667
12	36	7.19	25	49	923611111
13	37	1	26	50	930555555
14	38	2	27	51	937500000
15	39	3	28	52	944444444
16	40	4	29	53	951388889
17	41	5	30	54	958333333
18	42	6	31	55	965277778
19	43	7	32	56	972222222
20	44	8	33	57	979166667
21	45	9	34	58	986111111
22	46	10	35	59	993055555
23	47	11	36	00	000000000
24	48	12			

	Seconds	Thirds	Fourths	Fifths	
1	0000115741	0000001925	0000000032	0000000001	
2	231481	3857	64	0000000002	
3	347222	5787	96	2	
4	463963	7716	0000000129	2	
5	578704	9645	161	3	
6	694444	0000011574	193	3	
7	810185	13503	225	4	
8	925926	15432	257	4	
9	0001041666	17361	289	5	
10	1157407	19290	321	5	
11	1273148	21219	354	6	
12	1388889	23148	387	7	
13	1504630	25077	420	7	
14	1620371	27006	453	8	
15	1736112	28935	486	8	
16	1851853	30864	518	9	
17	1967593	32793	550	9	
18	2083333	34722	582	10	
19	2199074	36651	614	10	
20	0002314815	0000038580	0000000643	0000000011	
21	2430555	40509	675	11	
22	2546296	42438	707	12	
23	2662037	44367	739	12	
24	2777778	46296	771	13	
25	2893518	48225	803	13	
26	3009259	50154	836	14	
27	3125000	52083	868	14	
28	3240741	54112	902	15	
29	3356482	56041	934	15	
30	0003472222	0000057870	0000000965	0000000016	

	Seconds	Thirds	Fourths	Fifths
31	0003587963	00000059799	0000000997	0000000016
32	3703704	61728	1030	17
33	3819444	63657	1062	17
34	3935185	65586	1094	18
35	4050926	67515	1126	18
36	4166667	69444	1157	19
37	4282407	71373	1189	19
38	4398148	73302	1222	20
39	4513889	75231	1254	20
40	4629630	77160	1286	21
41	4745370	79089	1318	22
42	4861111	81018	1350	22
43	4976852	82947	1382	23
44	5092592	84876	1414	23
45	5208333	86805	1446	24
46	5324074	88734	1479	24
47	5439814	90663	1511	25
48	5555555	92592	1544	25
49	5671296	94521	1676	26
50	5787037	96451	1680	27
51	5902778	98380	1641	27
52	6018518	100309	1673	28
53	6134259	102238	1705	28
54	6250000	104167	1737	29
55	6365741	106096	1770	29
56	6481481	108025	1802	30
57	6597222	109954	1834	30
58	6712963	111883	1866	31
59	6828704	113812	1898	31
60	6944444	115741	1929	32

A Table converting Hours and parts into Degrees and parts of the Equator.

Ho.	Deg.	M	D. Parts.	M	D. Parts.	M	D. Parts.
1	15	01	00,15000	34	05,10	67	10,05
2	30	02	00,30	35	05,25	68	10,30
3	45	03	00,45	36	05,40	69	10,35
4	60	04	00,60	37	05,55	70	10,50
5	75	05	00,75	38	05,70	71	10,65
6	90	06	00,90	39	05,85	72	10,80
7	105	07	01,05	40	06,00	73	10,95
8	120	08	01,20	41	06,15	74	11,10
9	135	09	01,35	42	06,30	76	11,25
10	150	10	01,50	43	06,45	77	11,40
11	165	11	01,65	44	06,60	57	11,55
12	180	12	01,80	45	06,75	78	11,70
13	195	13	01,95	46	06,90	79	11,85
14	210	14	02,10	47	07,05	80	12,00
15	225	15	02,25	48	07,20	81	12,15
16	240	16	02,40	49	07,35	82	12,30
17	255	17	02,55	50	07,50	83	12,45
18	270	18	02,70	51	07,65	84	12,60
19	285	19	02,85	52	07,80	85	12,75
20	300	20	03,00	53	07,95	86	12,90
21	315	21	03,15	54	08,10	87	13,05
22	330	22	03,30	55	08,25	88	13,20
23	345	23	03,45	56	08,40	89	13,35
24	360	24	03,60	57	08,55	90	13,50
		25	03,75	58	08,70	91	13,65
		26	03,90	59	08,85	92	13 80
		27	04,05	60	09,00	93	13' 93
		28	04,20	61	09,15	94	14' 10
		29	04,35	62	09,30	95	14' 25
		30	04,50	63	09,45	96	14' 40
		31	04,65	64	09,60	97	14,55
		32	04,80	65	09,75	98	14,70
		33	04,95	66	09,90	99	14,85

A Perpetual Table for the Equation of Time.

D	♈ P. Add	♉ P. Add	♊ P. Add	♋ P. Sub.	♌ P. Sub.	♍ P. Sub.	D
0	00000	14027	14639	00000	14639	14027	30
1	00555	14333	14362	00611	14917	13722	29
2	01111	14583	14055	01194	15167	13389	28
3	01638	14861	13750	01805	15389	13055	27
4	02194	15111	13416	02416	15583	12694	26
5	02750	15333	13055	03000	15778	12333	25
6	03305	15527	12667	03583	15944	11944	24
7	03833	15722	12278	04361	16111	11555	23
8	04389	15889	11861	04750	16222	11138	22
9	04917	16027	11444	05333	16333	10722	21
10	05444	16167	11000	05917	16416	10305	20
11	05972	16278	10555	06472	16472	09861	19
12	06472	16389	10083	07000	16527	09389	18
13	07000	16444	09611	07555	16555	08944	17
14	07500	16500	09111	08083	16555	08472	16
15	07972	16555	08611	08611	16555	07972	15
16	08472	16555	08883	09111	16500	07500	14
17	08944	16555	07555	09611	16444	07000	13
18	09389	16527	07000	10083	16389	06472	12
19	09861	16472	06472	10555	16278	05972	11
20	10305	16416	05917	11000	16167	05444	10
21	10722	16333	05333	11444	16029	04917	9
22	11138	16222	04750	11862	15889	04389	8
23	11555	16111	04361	12278	15722	03833	7
24	11944	15944	03583	12667	15527	03305	6
25	12333	15778	03000	13055	15333	02750	5
26	12694	15583	02416	13426	15112	02194	4
27	13055	15389	01805	13750	14861	01638	3
28	13389	15167	01194	14055	14583	01111	2
29	13722	14917	00611	14361	14333	00555	1
30	14027	14639	00000	14639	14027	00000	0
D	♓ Sub.	♒ Sub.	♑ Sub.	♐ Adde	♏ Add	♎ Add	D

The Suns mean Motions.

Epochæ	Longit. ☉ Deg. parts	Apog. ☉ Deg. parts	1 ♈ & Fix. Deg. Parts.
Christi.	278.98331	70.52264	4. 97557
1600	290.94859	95.59094	27. 61667
1620	291.09815	95.90680	27. 89968
1640	291.24771	96.22265	28. 18270
1660	291.39724	96.53851	28. 46571
1	359.76107	0.01578	0. 01414
2	359.52213	0.03156	0. 02828
3	359.28310	0.04734	0. 04242
B 4	0.02991	0.06317	0. 05660
5	359.79098	0.07895	0. 07074
6	359.55205	0.09473	0. 08488
7	359.31311	0.11051	0. 09903
B 8	0.05982	0.12634	0. 11321
9	359.82080	0.14212	0. 12735
10	359.58196	0.15790	0. 14149
11	359.34303	0.17369	0. 15563
B 12	0.08974	0.18951	0. 16981
13	359.85081	0.20529	0. 18395
14	359.61187	0.22107	0. 19809
15	359.37294	0.23686	0. 21223
B 16	0.11965	0.25268	0. 22641
17	359.88072	0.26864	0. 24055
18	359.64178	0.28425	0. 25469
19	359.40285	0.30003	0. 26884
B 20	0.14956	0.31585	0. 28302
40	0.29913	0.63171	0. 56603
60	0.44870	0.94756	0. 84905
80	0.59826	1.26342	1. 13206
100	0.74783	1.57927	1. 41508

The Sun's mean Motions.

Years.	Longit. ☉ Deg. parts.	Anom. ☉ Deg. parts.	Perig. ☉ Deg. parts.
100	0,74783	1,57927	1,41508
200	1,49566	3,15854	2,83016
300	2,24349	4,73781	4,24524
400	2,99133	6,31708	5,66033
500	3,73915	7,89635	7,07540
600	4,48698	9,47562	8,49048
700	5,23481	11,05489	9,90557
800	5,98264	12,63415	11,32065
900	6,73047	14,21342	12,73573
1000	7,47830	15,79269	14,15081
2000	14,95660	31,58538	28,30162
3000	22,43490	47,37808	42,45243
4000	29,91319	63,17077	56,60323
5000	37,39150	78,96346	70,75404

January	30,55505	0,00134	0,00120
February	58,15315	0,00255	0,00228
March	88,70820	0,00389	0,00349
April	118,27760	0,00519	0,00465
May	148,83265	0,00653	0,00586
June	178,40205	0,00783	0,00701
July	208,95710	0,00917	0,00821
August	239,51215	0,01051	0,00941
September	267,08155	0,01180	0,01058
October	269,63660	0,01314	0,01178
November	329,20600	0,01444	0,01294
December	359,76107	0,01578	0,01414

The Sun's mean Motions.

	In Dayes.				In Hours.
	☉ Longit. Deg. Parts.	☉ Apog. Parts.	Fixed ✱ Parts.		☉ Longit. Parts.
1	0.98565	.00004	,00004	1	,04107
2	1.97129	.00008	,00008	2	,08214
3	2.95694	.00013	,00012	3	,12321
4	3.94258	.00017	,00015	4	,16427
5	4.92823	.00022	,00019	5	,20534
6	5.91388	.00026	,00023	6	,24641
7	6.89953	.00030	,00027	7	,28748
8	7.88517	.00034	,00031	8	,32855
9	8.87082	.00039	,00035	9	,36962
10	9.85647	.00043	,00039	10	,41069
11	10.84211	.00048	,00043	11	,45175
12	11.82776	.00052	,00046	12	,49282
13	12.81341	.00056	,00050	13	,53389
14	13.79905	.00060	,00054	14	,57496
15	14.78470	.00065	,00058	15	,61603
16	15.77035	.00069	,00062	16	,65710
17	16.75599	.00073	,00066	17	,69817
18	17.74164	.00078	,00070	18	,73923
19	18.72729	.00082	,00074	19	,78030
20	19.71293	.00086	,00077	20	,82137
21	20.69858	.00091	,00081	21	,86244
22	21.68423	.00095	,00085	22	,90351
23	22.66987	.00099	,00089	23	,94458
24	23.65542	.00104	,00093	24	,98565
25	24.64117	.00108	,00097		
26	25.62681	.90112	,00101		
27	26.61246	.00117	,00105		
28	27.59811	.00121	,00108		
29	28.58375	.00125	,00112		
30	29.56940	.00130	,00116		
31	30.55505	.00134	,00120		
32	31.54069	.00138	,00124		

The Suns mean Motion.

In parts of an Hour.

	☉Long. Parts.		☉Long. Parts.		☉Long. Parts.
1	,00041	34	,01369	67	,02751
2	,00082	35	,01437	68	,02793
3	,00123	36	,01478	69	,02834
4	,00164	37	,01519	70	,02875
5	,00205	38	,01561	71	,02916
6	,00246	39	,01602	72	,02957
7	,00287	40	,01643	73	,02998
8	,00328	41	,01684	74	,03039
9	,00370	42	,01725	75	,03080
10	,00411	43	,01766	76	,03121
11	,00452	44	,01807	77	,03162
12	,00493	45	,01848	78	,03203
13	,00534	46	,01889	79	,03244
14	,00575	47	,01930	80	,03285
15	,00616	48	,01971	81	,03326
16	,00657	49	,02012	82	,03368
17	,00698	50	,02053	83	,03409
18	,00739	51	,02094	84	,03450
19	,00780	52	,02135	85	,03491
20	,00821	53	,02177	86	,03523
21	,00862	54	,02218	87	,03573
22	,00903	55	,02259	88	,03614
23	,00945	56	,02300	89	,03655
24	,00986	57	,02341	90	,03696
25	,01027	58	,02382	91	,03737
26	,01068	59	,02423	92	,03778
27	,01109	60	,02464	93	,03819
28	,01150	61	,02505	94	,03860
29	,01191	62	,02546	95	,03901
30	,01232	63	,02587	96	,03942
31	,01273	64	,02628	97	,03984
32	,01314	65	,02669	98	,04025
33	,01355	66	,02710	99	,04026

The Æquation of the Suns Excentrick.

Degrees	Æq: Sub: D. parts.	⊙ Distãce Logarithm	Degrees
1	0,03502	50076781	359
2	0,06966	50076767	358
3	0,10512	50076752	357
4	0,14012	50076724	356
5	0,17506	50076695	355
6	0,20996	50076464	354
7	0,24480	50076253	353
8	0,27580	50076041	352
9	0,31426	50075829	351
10	0,34886	50075561	350
11	0,38236	50075292	349
12	0,41776	50075023	348
13	0,45202	50074782	347
14	0,48616	50074540	346
15	0,52014	50074298	345
16	0,55400	50073888	344
17	0,58730	50073478	343
18	0,62120	50073068	342
19	0,65452	50072656	341
20	0,68766	50072245	340
21	0,72062	50071834	339
22	0,75334	50071347	338
23	0,78586	50070859	337
24	0,81816	50070372	336
25	0,85020	50069833	335
26	0,88200	50069294	334
27	0,91356	50068755	333
28	0,94424	50068246	332
29	0,97586	50067736	331
30	1,00650	50067244	330
DAti:		Logarithm	D

Degrees	Æq: Sub: D. Parts	Logarithm of the ⊙ Distance	Degrees
31	1,03700	5.0066482	329
32	1,06714	5.0065720	328
33	1,09696	5.0064958	327
34	1,12648	5.0064216	326
35	1,15566	5.0063474	325
36	1,18448	5.0062732	324
37	1,21296	5.0061917	323
38	1,24112	5.0061102	322
39	1,26890	5.0060287	321
40	1,29630	5.0059457	320
41	1,32318	5.0058615	319
42	1,34996	5.0057779	318
43	1,37620	5.0056904	317
44	1,40214	5.0056029	316
45	1,42746	5.0055154	315
46	1,45248	5.0054194	314
47	1,47708	5.0053236	313
48	1,50122	5.0052273	312
49	1,52494	5.0051279	311
40	1,54820	5.0050285	310
51	1,57180	5.0049290	309
52	1,59336	5.0048354	308
53	1,61522	5.0047418	307
54	1,63662	5.0046481	306
55	1,65754	5.0045293	305
56	1,67796	5.0044105	304
57	1,69790	5.0042916	303
58	1,71732	5.0041810	302
59	1,73784	5.0040704	301
60	1,75464	5.0039597	300
D	Adde	Logarithm	D

The Æquation of the Suns Excentrick.

Degrees	Æq: Sub: D. parts	Logarithm of the ☉ Distance	Degrees	Degrees	Æq: Sub: D. parts	Logarithm of the ☉ Distance	Degrees
61	1,77254	5,0038450	299	91	2,04444	5,0000038	269
62	1,79000	5,0037303	298	92	2,04412	4,9998690	268
63	1,80670	5,0036157	297	93	2,04320	4,9997342	267
64	1,82240	5,0035286	296	94	2,04168	4,9995972	266
65	1,83876	5,0034415	295	95	2,03940	4,9994602	265
66	1,85396	5,0033545	294	96	2,03672	4,9993231	264
67	1,86862	5,0031985	293	97	2,03328	4,9991886	263
68	1,88272	5,0030425	292	98	2,02926	4,9990542	262
69	1,89624	5,0028865	291	99	2,02460	4,9989198	261
70	1,90920	5,0027615	290	100	2,01932	4,9987851	260
71	1,92036	5,0026364	289	101	2,01342	4,9986506	259
72	1,93342	5,0025113	288	102	2,00690	4,9985162	258
73	1,94466	5,0023831	287	103	1,99974	4,9983844	257
74	1,95532	5,0022549	286	104	1,99200	4,9982526	256
75	1,96540	5,0021268	285	105	1,98362	4,9981208	255
76	1,97488	5,0019971	284	106	1,97468	4,9979918	254
77	1,98378	5,0018674	283	107	1,96504	4,9978628	253
78	1,99206	5,0017378	282	108	1,95486	4,9977338	252
79	1,99976	5,0016069	281	109	1,94406	4,9975992	251
80	2,00684	5,0014760	280	110	1,93264	4,9974648	250
81	2,01332	5,0013451	279	111	1,92066	4,9973304	249
82	2,01920	5,0012217	278	112	1,98082	4,9972113	248
83	2,02446	5,0010984	277	113	1,89606	4,6970824	247
84	2,02912	5,0009753	276	114	1,88106	4,9969535	246
85	2,03317	5,0008067	275	115	1,86668	4,9968355	245
86	2,03660	5,0006681	274	116	1,85172	4,9967075	244
87	2,03946	5,0005296	273	117	1,83622	4,9961795	243
88	2,04158	5,0003993	272	118	1,82000	4,9964581	242
89	2,04316	5,0002690	271	119	1,80346	4,9963366	241
90	2,04410	5,0201387	270	120	1,78622	4,9962151	240
D	Adde	Logarithm	D	D	Adde	Logarithm.	D

The Æquations of the Suns Excentrick.

Degrees	Æq: Sub: D. Parts	Logarithm of the ☉ Distãce	Degrees	Degrees	Æq: Sub: D: parts	Logarithm of the ☉ Distãce	Degrees
121	1,76844	4,9960958	239	151	1,00692	4,9931045	209
122	1,75010	4,9959766	238	152	0,97610	4,9931375	208
123	1,73120	4,9958574	237	153	0,94308	4,9930705	207
124	1,71290	4,9957427	236	154	0,91076	4,9930116	206
125	1,69180	4,9956279	235	155	0,87810	4,9929527	205
126	1,67130	4,9955131	234	156	0,84516	4,9928938	204
127	1,65114	4,9954018	237	157	0,81212	4,9928118	203
128	1,62954	4,9952906	232	158	0,77868	4,9927619	202
129	1,60663	4,9951794	231	159	0,74508	4,9627140	201
130	1,58100	4,9950747	230	160	0,71116	4,9926880	200
131	1,56164	4,9949700	229	161	0,67698	4,9926239	199
132	1,53748	4,9948653	228	162	0,64264	4,9925817	198
133	1,51356	4,9947664	227	163	0,60808	4,9925412	197
134	1,48892	4,9946676	226	164	0,57332	4,9925009	196
135	1,46394	4,9945688	225	165	0,53838	4,9924606	195
136	1,43848	4,9944696	224	166	0,50356	4,9924274	194
137	1,41258	4,9943704	223	167	0,46802	4,9923941	193
138	1,38622	4,9942712	222	168	0,43258	4,9923609	192
139	1,35944	4,9941772	221	169	0,39730	4,9923319	191
140	1,33214	4,9940832	220	170	0,36134	4,9923029	190
141	1,30458	4,9939892	219	171	0,32554	4,9922739	189
142	1,27650	4,9939076	218	172	0,29404	4,9922573	188
143	1,24804	4,9938199	217	173	0,25366	4,9922420	187
144	1,21918	4,9937322	216	174	0,21756	4,9922268	186
145	1,18994	4,9936519	215	175	0,18140	4,9922193	185
146	1,16030	4,9935715	214	176	0,14526	4,9922119	184
147	1,13030	4,9934911	213	177	0,10896	4,9922044	183
148	1,09994	4,9934180	212	178	0,07268	4,9921970	182
149	1,06922	4,9933448	211	179	0,03636	4,9921896	181
150	1,03818	4,9932716	210	180	0,00000	4,9921822	180

D	Adde	Logarith.	D	D	Adde	Logarith.	D

The Moone mean Motions.

Epochæ	Longit. ☽ Deg. parts	Anomaly ☽ Deg. parts	Latitude ☽ Deg. Parts.
Christi.	135.73167	215.54194	226. 95833
1600	20.69194	151.57111	99. 19250
1620	154.25389	191.27138	259. 59252
1640	287.81583	230.97194	59. 99833
1660	61.37805	270.67222	220. 40139
1	129.38389	88.71889	148. 71278
2	258.76805	177.43750	297. 42555
3	28.15194	266.15639	86. 13833
B 4	170.71250	7.93972	248. 08028
5	300.09639	96.65861	36. 79305
6	69.48028	185.37750	185. 50583
7	198.86444	274.09611	334. 21889
B 8	341.42472	15.87972	136. 16111
9	110.80861	104.59861	284. 87389
10	240.19278	193.31750	73. 58667
11	9.57667	282.03639	222. 29944
B 12	152.13722	23.82000	24. 24167
13	281.52111	112.53889	172. 97444
14	50.90500	201.25750	321. 66722
15	180.28917	288.97639	112. 38000
B 16	322.84944	31.76000	272. 32222
17	92.23333	120.47889	61. 03500
18	221.61750	209.19778	209. 74778
19	351.00139	297.91667	358. 46055
B 20	133.56194	39.70028	160. 40278
40	267.12389	79 40083	320. 80583
60	40.68611	119.15111	121. 20889
80	174.24805	158.80139	281. 61167
100	307.81000	198.50194	82. 01472

The Moons mean Motions.

Years.	Longit. ☽ Deg. parts.	Anom. ☽ Deg. parts.	Latitud. ☽ Deg. parts.
100	307, 81000	198, 50194	82, 01472
200	255, 62000	37, 00361	164, 02917
300	203, 43000	235, 50555	246, 04389
400	151, 24000	74, 00722	328, 05861
500	99, 05000	272, 50917	50, 07333
600	46, 86000	111, 01083	131, 08778
700	354, 67000	309, 51250	214, 10250
800	302, 48000	148, 01444	296, 11722
900	250, 29027	346, 51639	18, 13194
1000	198, 10027	185, 01805	100, 14639
2000	36, 20027	10, 03639	200, 29305
3000	234, 30055	195, 05444	300, 43944
4000	72, 40055	20, 07250	40, 58611
5000	270, 50083	205, 09083	140, 73250

January	48, 46833	45, 01444	50, 10722
February	57, 40722	50, 83417	60, 53167
March	105, 87555	95, 84861	110, 64139
April	141, 16722	127, 79805	147, 52194
May	189, 63555	172, 81250	197, 63167
June	224, 89417	204, 76194	234, 11222
July	273, 39555	249, 77639	284, 62194
August	321, 86389	294, 79055	334, 73167
September	357, 15555	326, 74028	11, 61222
October	45, 62387	11, 75472	61, 72194
November	80, 91583	43, 70417	98, 60250
December	129, 38387	88, 71889	148, 71278

The Moons mean Motions.

Days	Longit. ☽ Deg. Parts.	Anomaly ☽ Deg. Parts.	Latitude ☽ Deg. parts.
1	13,17639	13,06500	13,22944
2	26,35278	26,13000	26,45861
3	39,52917	39,19500	39,68805
4	52,70555	52,26000	52,91722
5	65,88194	65,32500	66,14667
6	79,50833	78,39000	79,37611
7	92,23472	91,45500	92,60528
8	105,41111	104,52000	105,83472
9	118,58750	117,58472	119,06417
10	131,76389	130,64972	132,29333
11	144,94028	143,71472	145,52278
12	158,11667	156,77972	158,75222
13	171,29305	169,84472	171,98139
14	184,46944	182,90972	185,21083
15	197,64583	195,97472	198,44028
16	210,82222	209,03972	211,66944
17	223,99861	222,10472	224,89889
18	237,17500	235,16972	238,12833
19	250,35139	248,23472	251,35750
20	263,52778	261,29972	264,58694
21	276,70417	274,36472	277,81639
22	289,88055	287,42972	291,04555
23	303,05694	300,49472	304,27500
24	316,23333	313,55972	317,50444
25	329,40972	326,62444	330,73361
26	342,58611	339,68944	343,96305
27	355,76250	352,75444	357,19250
28	8,93889	5,81944	10,42167
29	22,11528	18,88444	23,65111
30	35,29167	31,94944	36,88028
31	48,46805	45,01444	50,10972
32	61,64444	58,07944	63,33889

The Moons mean Motions.

	In Hours.			In parts of an Hour.		
	Longit. ☽	Anomal. ☽	Latitude ☽	Long. ☽	Anom.	Latit.
	D. Parts	D. parts	D. parts	Parts.	Parts.	Parts.
1	0,54889	0,54444	0,55139	1,00549	,00544	,00551
2	1,09805	1,08861	1,10278	2,01098	,01088	,01103
3	1,64694	1,63305	1,65389	3,01647	,01633	,01654
4	2,19611	2,17750	2,20528	4,02196	,02177	,02205
5	2,74500	2,72194	2,75639	5,02745	,02722	,02756
6	3,29417	3,26611	3,30750	6,03294	,03266	,03307
7	3,84305	3,81055	3,85889	7,03843	,03810	,03858
8	4,39222	4,35500	4,41000	8,04392	,04355	,04410
9	4,94111	4,89944	4,96139	9,04941	,04899	,04961
10	5,49000	5,44361	5,51250	10,05490	,05443	,05512
11	6,03917	5,98805	6,06361	11,06039	,05988	,06063
12	6,58805	6,53250	6,61500	12,06588	,06532	,06615
13	7,13722	7,07694	7,16611	13,07137	,07077	,07166
14	7,68611	7,62111	7,71750	14,07686	,07621	,07717
15	8,23528	8,16555	8,26861	15,08235	,08165	,08268
16	8,79417	8,71000	8,81972	16,08784	,08710	,08819
17	9,33305	9,25444	9,37111	17,09333	,09254	,09371
18	9,88222	9,79861	9,92222	18,09882	,09798	,09922
19	10,43139	10,34305	10,47361	19,10431	,10343	,10473
20	10,98028	10,88750	11,02472	20,10980	,10887	,11024
21	11,52944	11,43194	11,57583	21,11529	,11432	,11576
22	12,07833	11,97611	12,12722	22,12078	,11976	,12127
23	12,62722	12,52055	12,67833	23,12627	,12520	,12678
24	13,17639	13,06500	13,22944	24,13176	,13065	,13229
				25,13725	,13609	,13780
				26,14274	,14153	,14331
				27,14823	,14698	,14883
				28,15372	,15242	,15434
				29,15921	,15787	,15985
				30,16470	,16331	,16536
				31,17019	,16885	,17083
				32,17567	,17416	,17623
				33,18117	,17966	,18183

The Moons mean Motions.

In parts of an Hour.

	Long. ☽	Anom. ☽	Latit. ☽		Long. ☽	Anom. ☽	Latit. ☽
	Parts.	Parts	Parts		Parts.	Parts.	Parts.
34	,18665	,18508	,18744	67	,36783	,36470	,36932
35	,19214	,19050	,19300	68	,37331	,37014	,37483
36	,19763	,19600	,19850	69	,37880	,37558	,38034
37	,20317	,20133	,20400	70	,38429	,38102	,38585
38	,20867	,20683	,20950	71	,38979	,38646	,39139
39	,21416	,21233	,21500	72	,39528	,39190	,39690
40	,21967	,21767	,22050	73	,40077	,39734	,40241
41	,22500	,22316	,22600	74	,40626	,40278	,40792
42	,23050	,22850	,23150	75	,41174	,40822	,41343
43	,23600	,23400	,23700	76	,41723	,41366	,41894
44	,24150	,23950	,24250	77	,42272	,41910	,42445
45	,24700	,24500	,24800	78	,42820	,42454	,42996
46	,25283	,25050	,25350	79	,43369	,42998	,43547
47	,25800	,25600	,25900	80	,43918	,43542	,44098
48	,26350	,26133	,26450	81	,44466	,44094	,44651
49	,26900	,26683	,27000	82	,45020	,44638	,45202
50	,27450	,27217	,27567	83	,45568	,45182	,45753
51	,28000	,27767	,28117	84	,46117	,45726	,46304
52	,28550	,28300	,28800	85	,46666	,46270	,46855
53	,29100	,28850	,29217	86	,47215	,46814	,47406
54	,29817	,29400	,29767	87	,47763	,47358	,47957
55	,30200	,29933	,30317	88	,48312	,47902	,48508
56	,30733	,30483	,30867	89	,48861	,48446	,49059
57	,31283	,31017	,31416	90	,49411	,48990	,49610
58	,31833	,31567	,31967	91	,49960	,49538	,50165
59	,32383	,32117	,32517	92	,50509	,50082	,50716
60	,32933	,32666	,33083	93	,51058	,50626	,51267
61	,33491	,33206	,33626	94	,51607	,51170	,51818
62	,34039	,33750	,34177	95	,52155	,51714	,52369
63	,34588	,34294	,34728	96	,52704	,52258	,52920
64	,35137	,34838	,35279	97	,53253	,52802	,53471
65	,35685	,35382	,35830	98	,53801	,53346	,54022
66	,36234	,35926	,36381	99	,54351	,53890	,54573

The Æquations of the Moons Excentrick.

Degrees	Æq: Sub D. parts.	☉ Distãce from Umb. 5,085424	Degrees	Degrees	Æq: Sub: D. Parts	☾ Distance from Umb.	Degrees
1	0,08356	5,0185341	359	31	2,48144	5.0161416	329
2	0,16706	5,0185258	358	32	2,55388	5.0159884	328
3	0,25068	5,0185174	357	33	2,62582	5.0158351	327
4	0,33414	5,0184826	356	34	2,69688	5.0156656	326
5	0,41750	5,0184479	355	35	2,76756	5.0154962	325
6	0,50076	5,0184131	354	36	2,83732	5.0153267	324
7	0,58424	5,0183845	353	37	2,90628	5.0151439	323
8	0,66684	5,0183560	352	38	2,97520	5.0149611	322
9	0,74962	5,0183274	351	39	3,04184	5.0147782	321
10	0,83222	5,0182718	350	40	3,12824	5.0145848	320
11	0,91458	5,0182163	349	41	3,17404	5.0143915	319
12	0,99670	5,0181607	348	42	3,22762	5.0141961	318
13	1,07854	5,0180979	347	43	3,30266	5.0140007	317
14	1,16010	5,0180352	346	44	3,36554	5.0138052	316
15	1,24136	5,0179724	345	45	3,42768	5.0135901	315
16	1,32228	5,0178897	344	46	3,48880	5.0133649	114
17	1,40282	5,0178071	343	47	3,54892	5.0131474	313
18	1,48302	5,0177244	342	48	3,60806	5.0129254	312
19	1,56280	5,0176271	341	49	3,666.0	5.0126977	311
20	1,64212	5,0175298	340	50	3,73358	5.0124700	310
21	1,72108	5,0174325	339	51	3,77940	3.0122423	309
22	1,79908	5,0173200	338	52	3,83442	5.0120012	308
23	1,87750	5,0172075	337	53	3,88836	5.0117601	307
24	1,95498	5,0170950	336	54	3,94112	5.0115189	306
25	2,03190	5,0169696	335	55	3,99296	5.0112631	305
26	2,10830	5,0168443	334	56	3,04358	5.0110073	304
27	2,18410	5,0167189	333	57	4,09306	5.0107514	303
28	2,29594	5,0165775	332	58	4,14138	5.0104891	302
29	2,33394	5,0164362	331	59	4,18854	5.0102269	301
30	2,40792	5,0162948	330	60	4,23448	5.0099646	300
D	Adde	Logarithm.	D	D	Adde	Logarithm.	D

The Æquation of the Moons Excentrick.

Degrees	Æq: Sub: D. parts	☾ Distance from Umbilique.	Degrees		Degrees	Æq: Sub: D. parts	☾ Distance from the Umbilique.	Degrees
61	4,27924	5,00097259	299		91	4,99834	5, 0004952	269
62	4,32278	5,0094872	298		92	4,99988	5, 0001649	268
63	4,36508	5,0091485	297		93	4,99988	4, 9998345	267
64	4,40614	5,0088671	296		94	4,99836	4, 9995032	266
65	4,44708	5,0085856	295		95	4,99532	4, 9991719	265
66	4,48444	5,0083041	294		96	4,99070	4, 9988405	264
67	4,52166	5,0080136	293		97	4,98460	4, 9985193	263
68	4,54774	5,0077231	292		98	4,97696	4, 9981982	262
69	4,59222	5,0074326	291		99	4,96736	4, 9978770	261
70	4,62546	5,0070981	290		100	4,95706	4, 9972811	260
71	4,65612	5,0067637	289		101	4,94476	4, 9966852	259
72	4,68922	5,0064292	288		102	4,93096	4, 9960892	258
73	4,71674	5,0061720	287		103	4,91562	4, 9960119	257
74	4,74506	5,0059148	286		104	4,89874	4, 9959347	256
75	4,77150	5,0056575	285		105	4,88034	4, 9958574	255
76	4,79654	5,0053376	284		106	4,86042	4, 9955301	254
77	4,82020	5,0050177	283		107	4,82944	4, 9952028	253
78	4,84242	5,0046977	282		108	4,81594	4, 9948754	252
79	4,86322	5,0042544	281		109	4,79146	4, 9945474	251
80	4,89534	5,0038111	280		110	4,76544	4, 9942193	250
81	4,90048	5,0033678	279		111	4,73788	4, 9939013	249
82	4,91694	5,0031731	278		112	4,70884	4, 9935795	248
83	4,93196	5,0029785	277		113	4,67888	4, 9932577	247
84	4,94548	5,0027838	276		114	4,64632	4, 9929358	246
85	2,95750	5,0024588	275		115	4,61274	4, 9926191	245
86	4,96806	5,0021339	274		116	4,57778	4, 9923025	244
87	4,97714	5,0010809	273		117	4,54128	4, 9919859	243
88	4,98460	5,0014811	272		118	4,50350	4, 9916852	242
89	4,99078	5,0011534	271		119	4,16386	4, 9913845	241
90	4,99532	5,0008256	270		120	4,42300	4, 9910837	240
D	Adde	Logarithm.	D		D	Adde	Logarithm.	D

The Æquations of the Moons Excentrick.

Degrees	Æq: Subt: D. Parts	☾ Distance from the Umbilique	Degrees	Degrees	Æq: Subt: D: parts	☾ Distance from the Umbilique	Degrees
121	4,38086	4,99077779	239	151	2,51028	4,98333262	209
122	4,33720	4,99047221	238	152	2,44030	4,98331432	208
123	4,29210	4,99016641	237	153	2,36074	4,98329601	207
124	4,24560	4,98997511	236	154	2,28030	4,98328019	206
125	4,19772	4,98978381	235	155	2,19126	4,98326437	205
126	4,14546	4,98959151	234	156	2,11722	4,98324855	204
127	4,09734	4,98921171	237	157	2,03458	4,98323435	203
128	4,04550	4,98883091	232	158	1,95120	4,98322015	202
129	3,99248	4,98845001	231	159	1,86718	4,98320595	201
130	3,93798	4,98817311	230	160	1,78252	4,98319334	200
131	3,88206	4,98789621	229	161	1,69724	4,98318073	199
132	3,87486	4,98761931	228	162	1,61138	4,98316811	198
133	3,76638	4,98735741	227	163	1,52494	4,98315083	197
134	3,70738	4,98709561	226	164	1,43800	4,98133356	196
135	3,64572	4,98683371	225	165	1,35118	4,98111628	195
136	3,58356	4,98658401	224	166	1,26300	4,98111425	194
137	3,52020	4,98633431	223	167	1,17430	4,98111223	193
138	3,45564	4,98608461	222	168	1,08554	4,98111020	192
139	3,38920	4,98581461	221	169	0,99768	4,98110309	191
140	3,32310	4,98554461	220	170	0,90692	4,98099599	190
141	3,25514	4,98537451	219	171	0,81714	4,98088889	189
142	3,18610	4,98351518	218	172	0,72704	4,98083891	188
143	3,11598	4,98491901	217	173	0,63724	4,98078931	187
144	3,04478	4,98470611	216	174	0,54618	4,98073941	186
145	2,97260	4,98449661	215	175	0,45545	4,98070991	185
146	2,89938	4,98428721	214	176	0,36518	4,98068041	184
147	2,82518	4,98407771	213	177	0,27352	4,98066909	183
148	2,75004	4,98388821	212	178	0,18242	4,98064411	182
149	2,67392	4,98369871	211	179	0,09126	4,98063731	181
150	2,59686	4,98350921	210	180	0,00000	4,98063041	180

D	Adde	Logarith.	D	D	Adde	Logarith.	D

A Table for the finding of the second and third inaequalities of the Moon.

	Subtense of the ☽ double dist. from ☉	Variation Adde	
	Logarithm.	Parts.	
0	0,0000000	,00000	360
1	1,5805276	,00119	359
2	1,8815410	,02389	358
3	2,0577047	,03555	357
4	2,1825049	,04722	356
5	2,2793653	,05887	355
6	2,3584859	,07055	354
7	2,4253610	,08222	353
8	2,4832702	,09389	352
9	2,5343290	,10555	351
10	2,5799817	,11722	350
11	2,6212586	,12889	349
12	2,6589203	,14055	348
13	2,6935445	,15194	347
14	2,7255502	,16333	346
15	2,7553834	,17472	345
16	2,7832410	,18611	344
17	2,8093878	,19750	343
18	2,8339081	,20861	342
19	2,8572949	,21972	341
20	2,8793554	,23083	340
21	2,9003187	,24194	339
22	2,9202845	,25278	338
23	2,9393410	,26361	337
24	2,9575646	,27444	336
25	2,9750225	,28528	335
26	2,9917737	,29583	334
27	3,0078710	,30638	333
28	3,0233609	,31694	332
29	3,0382853	,32722	331
30	3,0526819	,33750	330
	Logarithm.	Subst.	

	Subtense of the ☽ double dist. from ☉	Variation Adde	
	Logarithm	Parts.	
30	3,0526819	.34750	330
1	3,0665845	.34750	329
32	3,0800238	.35750	328
33	3,0900275	.36750	327
34	3,1056210	.37722	326
35	3,1178275	.38694	325
36	3,1296681	.39667	324
37	3,1411621	.40655	323
38	3,1523276	.41555	322
39	3,1630910	.42472	321
40	3,1737374	.43389	320
41	3,1840110	.44278	319
42	3,1940149	.45167	318
43	3,2037611	.46083	317
44	3,2132611	.46889	316
45	3,2225254	.47722	315
46	3,2315637	.48555	314
47	3,2403854	.49361	313
48	3,2489990	.50167	312
49	3,2574127	.50944	311
50	3,2655340	.51694	310
51	3,2706701	.52444	309
52	3,2815277	.53194	308
53	3,2892151	.53916	307
54	3,2967325	.54611	306
55	3,3040913	.55305	305
56	3,3012950	.55972	304
57	3,3183486	.56611	303
58	3,3252569	.57250	302
59	3,3320245	.57861	301
60	3,3386557	.58444	300
	Logarithm.	Subst.	

A Table for the finding of the second and third inæqualities of the Moon.

	Subtense of the ☽ double dist. from ☉ Logarithm.	Variation Adde Parts.			Subtense of the ☽ double dist. from ☉ Logarithm.	Variation Adde Parts.	
60	3,3386557	,58444	300	90	3,4891707	,67500	270
61	3,3451546	,59058	299	91	3,4929278	,67472	269
62	3,3515250	,59583	298	92	3,4966198	,67444	268
63	3,3577708	,60139	297	93	3,5002479	,67417	267
64	3,3638954	,60667	296	94	3,5038132	,67361	266
65	3,3699022	,61167	295	95	3,5073166	,67250	265
66	3,3757945	,61667	294	96	3,5107592	,67139	264
67	3, 815752	,62139	293	97	3,5141418	,67000	263
68	3,3872474	,62583	292	90	3,5174656	,66833	262
69	3,3928137	,63000	291	91	3,5207312	,66667	261
70	3,3982770	,63417	290	100	3,5239397	,66472	260
71	3,4036397	,63805	289	101	3,5270918	,66350	259
72	3,4089044	,64167	288	102	3,5301883	,66028	258
73	3,4130733	,64500	287	103	3,5332301	,65778	257
74	3,4191487	,64861	286	104	3,5362178	,65500	256
75	3,4241328	,65194	285	105	3,5391524	,65194	255
76	3,4290277	,65500	284	106	3,5420343	,64861	254
77	3,4338353	,65778	283	107	3,5448644	,64500	253
78	3,4375575	,66028	282	108	3,5476433	,64167	252
79	3,7431962	,66250	281	109	3,5503717	,63805	251
80	3,4477532	,66427	280	100	3,5530502	,63417	250
81	3,4522301	,66667	279	111	3,5556794	,63000	249
82	3,4566282	,66833	278	112	3,5582599	,62583	248
83	3,4609503	,67000	277	113	3,5607923	,62139	247
84	3,4651966	,67139	276	114	3,5632771	,61667	246
85	3,4693690	,67250	275	115	3,5656149	,61167	245
86	3,4704690	,67361	274	116	3,5681062	,60667	244
87	3,4465979	,67417	273	117	3,5704515	,60139	243
88	3,4814570	,67444	272	118	3,5727513	,69583	242
89	3,4853475	,67472	271	119	3,5750061	,59028	241
90	3,4891707	,67500	270	120	3,5772163	,58444	240
D	Logarithm.	Subst.	D	D	Logarithm.	Subst.	D

A Table for the finding of the second and third inæqualities of the Moon.

D	Subtense of the ☽ double dist. from ☉ Logarithm.	Variation Adde Parts.	D
120	3,5772163	,58444	240
121	3,5793825	,57861	239
122	3,5815050	,57250	238
123	3,5835842	,56611	237
124	3,5856206	,55972	236
125	3,5876126	,55305	235
126	3,5895666	,54611	234
127	3,5917769	,53916	233
128	3,5933457	,53194	232
229	3,5951739	,52444	231
130	3,5969614	,51694	230
131	3,5987086	,50944	229
132	3,6004159	,50167	228
133	3,6029834	,49361	227
134	3,6037118	,48555	226
135	3,6053010	,47722	225
136	3,6068516	,46889	224
137	3,6083636	,46083	223
138	3,6098374	,45167	222
139	3,6106733	,44278	221
140	3,6126715	,43389	220
141	3,6140323	,42472	219
142	3,6153558	,41555	218
143	3,6166423	,40611	217
144	3,6178932	,39667	216
145	3,6191052	,38694	215
146	3,6208820	,37722	214
147	3,6314227	,36750	213
148	3,6325273	,35750	212
149	3,6235962	,34750	211
150	2,6246295	,33750	210
D	Logarithm.	Subst.	

D	Subtense of the ☽ double dist. from ☉ Logarithm	Variation Adde Parts.	D
150	3,6246295	·33750	210
151	3,6256273	·32722	209
152	3,6265898	·31694	208
153	3,6275172	·30638	207
154	3,6284096	·29583	206
155	3,6292672	·28528	205
156	3,6300901	·27444	204
157	3,6308784	·26361	203
158	3,6316323	·25278	202
159	3,6333518	·24194	201
160	3,6330372	·23083	200
161	3,6336884	·21972	199
162	3,6343056	·20861	198
163	3,6348890	·19750	197
164	3,6354385	·18611	196
165	3,6359543	·17472	195
166	3,6364364	·16333	194
167	3,6368850	·15194	193
168	3,6373000	·14055	192
169	3,6376817	·12889	191
170	3,6380299	·11722	190
171	3,6387448	·10555	189
172	3,6386265	·09389	188
173	3,6388749	·08222	187
174	3,6390901	·07055	186
175	3,6392722	·05889	185
176	3,6394211	·04722	184
177	3,6395369	·03555	183
178	3,6396295	·02389	182
179	3,6396792	·01194	181
180	3,6396857	·00000	180
	Logarithm.	Subst.	D

Bullialdus his Table of Evection.

	Evectiõ Subst.	Scrupl. of proportiõ.	Variation Adde			Evectiõ Subst.	Scrupl. of proportiõ.	Variation Adde	
	D. Parts.	Parts.	Parts.			D. Parts.	Parts	Parts.	
0	0,00000	,00000	,00000	360	30	1,16138	,25882	,33750	330
1	0,04028	,00873	,01194	359	31	1,19722	,26723	,34750	329
2	0,08055	,01745	,02389	358	32	1,23278	,27563	,35750	328
3	0,12083	,02617	,03555	357	33	1,26833	,28400	,36750	327
4	0,16083	,03489	,04722	356	34	1,30305	,29237	,37722	326
5	0,20083	,04362	,05887	355	35	1,33750	,30072	,38694	325
6	0,24111	,05234	,07055	354	36	1,37167	,30901	,39667	324
7	0,28083	,06105	,08222	353	37	1,40556	,30730	,40655	323
8	0,32028	,06975	,09389	352	38	1,43944	,32553	,41555	322
9	0,36000	,07845	,10555	351	39	1,47222	,33380	,42472	321
10	0,39944	,08715	,11722	350	40	1,50500	,34202	,43389	320
11	0,43889	,09584	,12889	349	41	1,53750	,35020	,44278	319
12	0,47833	,10453	,14055	348	42	1,56972	,35836	,45167	318
13	0,51750	,11320	,15194	347	43	1,60139	,36650	,46083	317
14	0,55667	,12187	,16333	346	44	1,63278	,37460	,46889	316
15	0,59583	,13052	,17472	345	45	1,66389	,38268	,47728	315
16	0,63472	,13917	,18611	344	46	1,69444	,39073	,78555	314
17	0,67333	,14780	,19750	343	47	1,72444	,39874	,49361	313
18	0,71222	,15643	,20861	342	48	1,75444	,40673	,50167	312
19	0,75083	,16504	,21972	341	49	1,78417	,41469	,50944	311
20	0,78917	,17364	,23083	340	50	1,81361	,42262	,51694	310
21	0,82750	,18222	,24194	339	51	1,84278	,43051	,52444	309
22	0,86528	,19081	,25278	338	52	1,87139	,43837	,53194	308
23	0,90273	,19936	,26361	337	53	1,89944	,44619	,53916	307
24	0,94055	,20791	,27444	336	54	1,92895	,45395	,54611	306
25	0,97805	,21643	,28528	335	55	1,95333	,46174	,55305	305
26	1,01528	,22495	,29583	334	56	1,97917	,46947	,55972	304
27	1,05222	,23344	,30638	333	57	2,00444	,47715	,56611	303
28	1,08889	,24191	,31694	332	58	2,02917	,48481	,57250	302
29	1,12527	,25038	,32722	331	59	2,05333	,49241	,57861	301
30	1,16138	,25882	,33750	330	60	2,07694	,50000	,58444	300
	Adde		Subst.			Adde		Subst.	

[illegible] the Table of Evection.

D	Evectiō Subst. D. Parts.	Scrupl. of proportiō. Parts.	Variation Adde Parts.		D	Evectiō Substr. D. Parts.	Scrupl. of proportiō. Parts.	Variation Adde Parts.	D
60	2,07694	,50000	,58444	300	90	2,49333	70711	,67500	270
61	2,10000	,50753	,59028	299	91	2,49667	,71325	67472	269
62	2,12250	,51903	,59583	298	92	2,49889	,71933	,67444	268
63	2,14444	,52249	,60139	297	93	2,50000	,72537	,67417	267
64	2,16583	,52991	,60667	296	94	2,49889	,73135	,67361	266
65	2,18667	,53729	,61167	295	95	2,49778	,73727	,67250	265
66	2,20694	,54463	,61667	294	96	2,49639	,74314	,67139	264
67	2,22667	,55193	,62139	293	97	2,49444	,74895	,67000	263
68	2,24583	,55919	,62583	292	98	2,49222	,75471	,66833	262
69	2,26444	,56640	,63000	291	99	2,48972	,76040	,66667	261
70	2,28222	,57357	,63417	290	100	2,48667	,76604	,66472	260
71	2,29917	,58070	,63805	289	101	2,48333	,77162	,66250	259
72	2,31527	,58778	,64167	288	302	2,47944	,77714	,66028	258
73	2,33055	,59482	,64500	287	103	2,47139	,78260	,65778	257
74	2,34527	,60181	,64861	286	104	2,46917	,78801	,65600	256
75	2,35944	,60876	,65194	285	105	2,46278	,79335	,65194	255
76	2,36750	,61566	,65500	284	106	2,45500	,79863	,64861	254
77	2,38611	,62251	,65778	283	107	2,44611	,80385	,64500	253
78	2,39889	,62932	,66028	282	108	2,43611	,80901	,64167	252
79	2,41055	,63607	,66250	281	109	2,42556	,81411	,63805	251
80	2,42222	,64278	,66472	280	110	2,41389	,81915	,63417	250
81	2,43333	,64944	,66667	279	111	2,40139	,82412	,63000	249
82	2,44361	,65605	,66833	278	112	2,38861	,82903	,62583	248
83	2,45278	,66262	,67000	277	113	2,37583	,83388	,62139	247
84	2,96083	,66913	,67139	276	114	2,36194	,83867	,61667	246
85	2,46778	,67559	,67250	275	115	2,34722	,84339	,61167	245
86	2,27417	,68199	,67361	274	116	2,32972	,84805	,60667	244
87	2,48000	,68835	,67417	273	117	2,31222	,85264	,60139	243
88	2,48500	,69465	,67444	272	118	2,29472	,85716	,59583	242
89	2,48944	,70091	,67472	271	119	2,27722	,86162	,59028	241
90	2,49333	,70711	,67500	70	120	2,25972	,86600	,58444	240
	Adde		Subst.			Adde		Substr.	

Bullialdus his Table of Evection.

	Evectiõ Sub.	Scruple of proportiõ.	Variation Adde			Evectiõ Sub.	Scruple of proportiõ.	Variation Adde	
D	D. Parts.	Parts.	Parts.	D	D	D. Parts	Parts.	Parts.	
120	2,25972	.86602	,58444	240	150	1,35472	,96592	,33750	210
121	2,24083	.87135	,57861	239	151	1,31472	,96814	,32722	209
122	2,22111	.87462	,57250	238	152	1,27417	,97029	,31694	208
123	2,20038	.87882	,56611	237	153	1,23305	,97237	,30638	207
124	2,17833	.88295	,55972	236	154	1,19167	,97437	,29583	206
125	2,15555	.88701	,55305	235	155	1,14972	,97629	,28528	205
126	2,13167	.89100	,54611	234	156	1,10722	,97815	,27444	204
127	2,10694	.89493	,53916	233	157	1,06417	,97992	,26361	203
128	2,08138	.89879	,53194	232	158	1,02056	,98163	,25278	202
129	2,05500	.90258	,52444	231	159	0,97667	,98325	,24194	201
130	2,02805	.90631	,51694	230	160	0,93250	,98481	,23083	100
131	2,00055	.90996	,50944	229	161	0,88778	,98628	,21972	199
132	1,97222	.91354	,50167	228	162	0,84278	,98769	,20861	198
133	1,94333	.91706	,49 61	227	163	0,79750	,98901	,19750	197
134	1,91389	.92050	,48555	226	164	0,75167	,99027	,18611	196
135	1,88138	.92388	,47722	225	165	0,70556	,99144	,17472	195
136	1,85000	.92718	,46889	224	166	0,65944	,99254	,16333	194
137	1,81889	.93042	,46083	223	167	0,61305	,99357	,15194	193
138	1,78722	.93358	,45167	222	168	0,56667	,99452	,14055	192
139	1,75500	.93667	,44278	221	169	0,52000	,99535	,12889	191
140	1,72222	.93969	,43389	220	170	0,47333	,99619	,11722	190
141	1,68889	.94264	,42472	219	171	0,42667	,99692	,10555	189
142	1,65472	.94552	,41555	218	172	0,37972	,99756	,09389	188
143	1,62000	.94832	,40611	217	173	0,33278	,99813	,08222	187
144	1,58389	.95105	,39667	216	174	0,28556	,99863	,07055	186
145	1,54694	.95371	,38694	215	175	0,23833	,99905	,05889	185
146	1,50944	.95630	,37722	214	176	0,19083	,99939	,04722	184
147	1,47167	.95882	,36750	213	177	0,14333	,99966	,03555	183
148	1,43972	.96126	,35750	212	178	0,09556	,99985	,02389	182
149	1,39417	.96363	,34750	211	179	0,04778	,99996	,01194	181
150	1,35472	.96592	,33750	210	180	0,00000	,00000	,00000	180
	Adde		Sub.			Adde		Sub:	

A Compounded Table of the Æquation and Variation.

Degrees of Equation.	3 Sub	6 Sub.	9 Sub	12 Sub	15 Sub	18 Sub	21 Sub	Degrees.
0	0. 058	0, 116	0, 171	0. 224	0, 273	0, 299	0, 359	360
5	0. 059	0, 120	0, 178	0. 235	0, 290	0, 321	0, 399	355
10	0. 059	0, 120	0, 181	0. 242	0, 301	0, 338	0, 412	350
15	0. 058	0, 119	0, 181	0. 245	0, 308	0, 349	0, 430	345
20	0. 057	0, 117	0, 179	0. 243	0, 309	0, 354	0, 441	340
25	0. 054	0, 112	0, 175	0. 239	0, 306	0, 353	0, 444	335
30	0. 050	0, 106	0, 166	0. 232	0, 300	0, 349	0, 440	330
35	0. 045	0, 097	0, 155	0. 219	0, 287	0, 339	0, 432	325
40	0. 039	0, 087	0, 141	0. 202	0, 270	0, 321	0, 418	320
45	0. 032	0, 074	0, 124	0. 184	0, 248	0, 298	0, 395	315
50	0. 024	0, 059	0, 103	0. 158	0, 211	0, 271	0, 364	310
55	0. 015	0, 042	0, 080	0. 129	0, 188	0, 237	0, 329	305
60	0. 006	0, 024	0, 055	0. 097	0, 150	0, 196	0, 295	300
65	0A004	0, 005	0, 027	0. 054	0, 208	0, 150	0, 234	295
70	0. 015	0A016	0A003	0. 018	0, 063	0, 089	0, 157	290
75	0. 026	0, 038	0, 035	0A028	0, 013	0, 046	0, 116	285
80	0. 038	0, 062	0, 069	0. 062	0A040	0A014	0, 048	280
85	0. 050	0, 086	0, 105	0. 109	0, 096	0, 084	0A024	275
90	0. 063	0, 110	0, 141	0. 157	0, 155	0, 143	0, 101	270
95	0. 075	0, 135	0, 178	0. 205	0, 215	0, 184	0, 182	265
100	0. 087	0, 160	0, 216	0. 265	0, 276	0, 282	0, 265	160
105	0. 100	0, 185	0, 253	0. 304	0, 337	0, 353	0, 349	255
110	0. 112	0, 209	0, 289	0. 353	0, 399	0, 415	0, 414	250
115	0. 123	0, 233	0, 326	0. 402	0, 460	0, 496	0, 520	245
120	0. 134	0, 256	0, 361	0. 449	0, 520	0, 566	0, 604	240
125	0. 145	0, 277	0, 394	0. 495	0, 579	0, 636	0, 688	235
130	0. 155	0, 298	0, 426	0. 533	0, 635	0, 793	0, 768	230
135	0. 163	0, 316	0, 456	0. 580	0, 688	0, 767	0, 848	225
140	0. 171	0, 333	0, 481	0. 618	0, 738	0, 819	0, 923	220
145	0. 179	0, 349	0, 507	0. 652	0, 783	0, 883	0, 992	215
150	0. 185	0, 363	0, 537	0. 684	0, 824	0, 934	1, 057	210
155	0. 190	0, 374	0, 549	0. 712	0, 862	0, 981	1, 114	205
160	0. 194	0, 383	0, 564	0. 736	0, 895	0, 022	1, 168	200
165	0. 197	0, 391	0, 577	0. 714	0, 922	0, 058	1, 215	195
180	0. 199	0, 396	0, 588	0. 759	0, 943	0, 086	1, 254	190
175	0. 200	0, 399	0, 594	0. 771	0, 962	0, 111	1, 286	185
170	0. 201	0, 401	0, 597	0. 789	0, 975	0, 129	1, 312	180
Degrees of Equation.	Sub 177	Sub 174	Sub 171	Sub 168	Sub 162	Sub 162	Sub 159	Degrees of Equation.

Bullialdus his Table of Evection.

	Evectiõ Subst.	Scrupl. of proportiõ.	Variation Adde			Evectiõ Substr.	Scrupl. of proportiõ.	Variation Adde	
	D. Parts.	Parts.	Parts.			D. Parts.	Parts	Parts.	
0	0,00000	,00000	,00000	360	30	1,16138	,25882	,33750	330
1	0,04028	,00873	,01194	359	31	1,19722	,26723	,34750	329
2	0,08055	,01745	,02389	358	32	1,23278	,27565	,35750	328
3	0,12083	,02617	,03555	357	33	1,26833	,28406	,36750	327
4	0,16083	,03489	,04722	356	34	1,30305	,29237	,37722	326
5	0,20083	,04362	,05887	355	35	1,33750	,30072	,38694	325
6	0,24111	,05234	,07055	354	36	1,37167	,30901	,39667	324
7	0,28083	,06105	,08222	353	37	1,40556	,30730	,40655	323
8	0,32028	,06975	,09389	352	38	1,43944	,32553	,41555	322
9	0,36000	,07845	,10555	351	39	1,47222	,33380	,42472	321
10	0,39944	,08715	,11722	350	40	1,50500	,34202	,43389	320
11	0,43889	,09584	,12889	349	41	1,53750	,35020	,44278	319
12	0,47833	,10453	,14055	348	42	1,56972	,35836	,45167	318
13	0,51750	,11320	,15194	347	43	1,60139	,36650	,46083	317
14	0,55667	,12187	,16333	346	44	1,63278	,37460	,46889	316
15	0,59583	,13052	,17472	345	45	1,66389	,38268	,47720	315
16	0,63472	,13917	,18611	344	46	1,69444	,39073	,48555	314
17	0,67333	,14780	,19750	343	47	1,72444	,39874	,49361	313
18	0,71222	,15643	,20861	342	48	1,75444	,40673	,50167	312
19	0,75083	,16504	,21972	341	49	1,78417	,41469	,50944	311
20	0,78917	,17364	,23083	340	50	1,81361	,42262	,51694	310
21	0,82750	,18222	,24194	339	51	1,84278	,43051	,52444	309
22	0,86528	,19081	,25278	338	52	1,87139	,43837	,53194	308
23	0,90273	,19936	,26361	337	53	1,89944	,44619	,53916	307
24	0,94055	,20791	,27444	336	54	1,92895	,45395	,54611	306
25	0,97805	,21643	,28528	335	55	1,95333	,46174	,55305	305
26	1,01528	,22495	,29583	334	56	1,97917	,46947	,55972	304
27	1,05222	,23344	,30638	333	57	2,00444	,47715	,56611	303
28	1,08889	,24191	,31694	332	58	2,02917	,48480	,57250	302
29	1,12527	,25038	,32722	331	59	2,05333	,49241	,57861	301
30	1,16138	,25882	,33750	330	60	2,07694	,50000	,58444	300
	Adde		Subst.			Adde		Subst.	

[illegible] the Table of Evection.

D	Evectiõ Subst. D. Parts.	Scrupl. of proportiõ. Parts.	Variation Adde Parts.		D	Evectiõ Substr. D. Parts.	Scrupl. of proportiõ. Parts.	Variation Adde Parts.	D
60	2,07694	,50000	,58444	300	90	2,49333	,70711	,67500	270
61	2,10000	,50753	,59028	299	91	2,49667	,71325	,67472	269
62	2,12250	,51903	,59583	298	92	2,49889	,71933	,67444	268
63	2,14444	,52249	,60139	297	93	2,50000	,72537	,67417	267
[illegible]	[illegible]	,52991	,60667	296	94	2,49889	,73135	,67361	266
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,73727	,67250	265
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,74314	,67139	264
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,74895	,67000	263
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,75471	,66833	262
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,76040	,66667	261
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,76604	,66472	260
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,77162	,66250	259
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,77714	,66028	258
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,78260	,65778	257
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,78801	,65600	256
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,79335	,65194	255
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,79863	,64861	254
77	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,80385	,64500	253
78	2,39889	,62932	,66028	[illegible]	[illegible]	2,43611	,80901	,64167	252
79	2,41055	,63607	,66250	281	109	2,42556	,81411	,63805	251
80	2,42222	,64278	,66472	280	110	2,41389	,81915	,63417	250
81	2,43333	,64944	,66667	279	111	2,40139	,82412	,63000	249
82	2,44361	,65605	,66833	278	112	2,38861	,82903	,62583	248
83	2,45278	,66262	,67000	277	113	2,37583	,83388	,62139	247
84	2,96083	,66913	,67139	276	114	2,36194	,83867	,61667	246
85	2,46778	,67559	,67250	275	115	2,34722	,84339	,61167	245
86	2,27417	,68199	,67361	274	116	2,32972	,84805	,60667	244
87	2,48000	,68835	,67417	273	117	2,31222	,85264	,60139	243
88	2,48500	,69465	,67444	272	118	2,29472	,85716	,59583	242
89	2,48944	,70091	,67472	271	119	2,27722	,86163	,59028	241
90	2,49333	,70711	,67500	70	120	2,25972	,86600	,58444	240
	Adde		Subst.			Adde		Substr.	

Irregular Pagination.

Bullialdus his Table of Evection.

	Evectiõ Subst.	Scrupl. of proportiõ.	Variation Adde			Evectiõ Substr.	Scrupl. of proportiõ.	Variation Adde	
	D. Parts.	Parts.	Parts.			D. Parts.	Parts	Parts.	
0	0,00000	,00000	,00000	360	30	1,16138	,25882	,33750	330
1	0,04028	,00873	,01194	359	31	1,19722	,26723	,34750	329
2	0,08055	,01745	,02389	358	32	1,23278	,27563	,35750	328
3	0,12083	,02617	,03555	357	33	1,26833	,28400	,36750	327
4	0,16083	,03489	,04722	356	34	1,30305	,29237	,37722	326
5	0,20083	,04362	,05887	355	35	1,33750	,30072	,38694	325
6	0,24111	,05234	,07055	354	36	1,37167	,30901	,39667	324
7	0,28083	,06105	,08222	353	37	1,40556	,30730	,40655	323
8	0,32028	,06975	,09389	352	38	1,43944	,32553	,41555	322
9	0,36000	,07845	,10555	351	39	1,47222	,33380	,42472	321
10	0,39944	,08715	,11722	350	40	1,50500	,34202	,43389	320
11	0,43889	,09584	,12889	349	41	1,53750	,35020	,44278	319
12	0,47833	,10453	,14055	348	42	1,56972	,35836	,45167	318
13	0,51750	,11320	,15194	347	43	1,60139	,36650	,46083	317
14	0,55667	,12187	,16333	346	44	1,63278	,37460	,46889	316
15	0,59583	,13052	,17472	345	45	1,66389	,38268	,47722	315
16	0,63472	,13917	,18611	344	46	1,69444	,39073	,48555	314
17	0,67333	,14780	,19750	343	47	1,72444	,39874	,49361	313
18	0,71222	,15643	,20861	342	48	1,75444	,40673	,50167	312
19	0,75083	,16504	,21972	341	49	1,78417	,41469	,50944	311
20	0,78917	,17364	,23083	340	50	1,81361	,42262	,51694	310
21	0,82750	,18222	,24194	339	51	1,84278	,43051	,52444	309
22	0,86528	,19081	,25278	338	52	1,87139	,43837	,53194	308
23	0,90273	,19936	,26361	337	53	1,89944	,44619	,53916	307
24	0,94055	,20791	,27444	336	54	1,92695	,45395	,54611	306
25	0,97805	,21643	,28528	335	55	1,95333	,46174	,55305	305
26	1,01528	,22495	,29583	334	56	1,97917	,46947	,55972	304
27	1,05222	,23344	,30638	333	57	2,00444	,47715	,56611	303
28	1,08889	,24191	,31694	332	58	2,02917	,48481	,57250	302
29	1,12527	,25038	,32722	331	59	2,05333	,49241	,57861	301
30	1,16138	,25882	,33750	330	60	2,07694	,50000	,58444	300
	Adde		Subst.			Adde		Substr.	

Ballistic Tab. Table of Evection.

D	Evectiō Subst. D. Parts.	Scrupl. of proportiō. Parts.	Variation Adde Parts.		D	Evectiō Substr. D. Parts.	Scrupl. of proportiō. Parts.	Variation Adde Parts.	D
60	2,07694	,50000	,58444	300	90	2,49333	70711	,67500	270
61	2,10000	,50753	,59028	299	91	2,49667	,71325	67472	269
62	2,12250	,51903	,59583	298	92	2,49889	,71933	,67444	268
63	2,14444	,52249	,60139	297	93	,50000	,72537	,67417	267
64	2,16583	,52991	,60667	296	94	2,49889	,73135	,67361	266
65	2,18667	,53729	,61167	295	95	2,49778	,73727	,67250	265
66	2,20694	,54463	,61667	294	96	2,49639	,74314	,67139	264
67	2,22667	,55193	,62139	293	97	2,49444	,74895	,67000	263
68	2,24583	,55919	,62583	292	98	2,49222	,75471	,66833	262
69	2,26444	,56640	,63000	291	99	2,48972	,76040	,66667	261
70	2,28222	,57357	,63417	290	100	2,48667	,76604	,66472	260
71	2,29917	,58070	,63805	289	101	2,48333	,77162	,66250	259
72	2,31527	,58778	,64167	288	302	2,47944	,77714	,66028	258
73	2,33055	,59482	,64500	287	103	2,47139	,78260	,65778	257
74	2,34527	,60181	,64861	286	104	2,46917	,78801	,65600	256
75	2,35944	,60876	,65194	285	105	2,46278	,79335	,65194	255
76	2,36750	,61566	,65500	284	106	2,45500	,79863	,64861	254
77	2,38611	,62251	,65778	283	107	2,44611	,80385	,64500	253
78	2,39889	,62932	,66028	282	108	2,43611	,80901	,64167	252
79	2,41055	,63607	,66250	281	109	2,42556	,81411	,63805	251
80	2,42222	,64278	,66472	280	110	2,41389	,81915	,63417	250
81	2,43333	,64944	,66667	279	111	2,40139	,82412	,63000	249
82	2,44361	,65605	,66833	278	112	2,38861	,82903	,62583	248
83	2,45278	,66262	,67000	277	113	2,37583	,83388	,62139	247
84	2,96083	,66913	,67139	276	114	2,36194	,83867	,61667	246
85	2,46778	,67559	,67250	275	115	2,34722	,84339	,61167	245
86	2,27417	,68199	,67361	274	116	2,32972	,84805	,60667	244
87	2,48000	,68835	,67417	273	117	2,31222	,85264	,60139	243
88	2,48500	,69465	,67444	272	118	2,29472	,85716	,59583	242
89	2,48944	,70091	,67472	271	119	2,27722	,86162	,59028	241
90	2,49333	,70711	,67500	70	120	2,25972	,86600	,58444	240
	Adde		Subst.			Adde		Substr.	

Bullialdus his Table of Evection.

D	Evectiõ Sub. D. Parts.	Scruple of proportiõ. Parts.	Variation Adde Parts.	D
120	2,25972	,86602	,58444	240
121	2,24083	,87135	,57861	239
122	2,22111	,87662	,57250	238
123	2,20038	,87882	,56611	237
124	2,17833	,88295	,55972	236
125	2,15555	,88701	,55305	235
126	2,13167	,89100	,54611	234
127	2,10694	,89493	,53916	233
128	2,08138	,89879	,53194	232
129	2,05500	,90258	,52444	231
130	2,02805	,90631	,51694	230
131	2,00055	,90996	,50944	229
132	1,97222	,91354	,50167	228
133	1,94333	,91706	,49 61 2	227
134	1,91389	,92050	,48555	226
135	1,88138	,9 38	,47722	225
136	1,85000	,92718	,46889	224
137	1,81889	,93042	,46083	223
138	1,78722	,93358	,45167	222
139	1,75500	,93667	,44278	221
140	1,72222	,93969	,43389	220
141	1,68889	,94264	,42472	219
142	1,65472	,94552	,41555	218
143	1,62000	,94832	,40611	217
144	1,58389	,95105	,39667	216
145	1,54694	,95371	,38694	215
146	1,50944	,95630	,37722	214
147	1,47167	,95882	,36750	213
148	1,43972	,96126	,35750	212
149	1,39417	,96363	,34750	211
150	1,35472	,96592	,33750	210
	Adde		Sub.	

D	Evectiõ Sub. D. Parts	Scruple of proportiõ. Parts.	Variation Adde Parts.	D
150	1,35472	,96592	,33750	210
151	1,31472	,96814	,32722	209
152	1,27417	,97029	,31694	208
153	1,23305	,97237	,30638	207
154	1,19167	,97437	,29583	206
155	1,14972	,97629	,28528	205
156	1,10722	,97815	,27444	204
157	1,06417	,97992	,26361	203
158	1,02056	,98163	,25278	202
159	0,97667	,98325	,24194	201
160	0,93250	,98481	,23083	100
161	0,88778	,98628	,21972	199
162	0,84278	,98769	,20861	198
163	0,79750	,98901	,19750	197
164	0,75167	,99027	,18611	196
165	0,70556	,99144	,17472	195
166	0,6 944	,99254	,16333	194
167	0,61305	,99357	,15194	193
168	0,56667	,99452	,14055	192
169	0,52000	,99535	,12889	191
170	0,47333	,99619	,11722	190
171	0,42667	,99692	,10555	189
172	0,37972	,99756	,09389	188
173	0,33278	,99813	,08222	187
174	0,28556	,99863	,07055	186
175	0,23833	,99905	,05889	185
176	0,19083	,99939	,04722	184
177	0,14333	,99966	,03555	183
178	0,09556	,99985	,02389	182
179	0,04778	,99996	,01194	181
180	0,00000	,00000	,00000	180
	Adde		Sub.	

A Compounded Table of the Æquation and Variation.

Degrees of Equation.	3 Sub	6 Sub:	9 Sub	12 Sub	15 Sub	18 Sub	21 Sub	Degrees.
0	0. 058	0, 116	0, 171	0. 224	0, 273	0, 299	0, 359	360
5	0. 059	0, 120	0, 178	0. 235	0, 290	0, 321	0, 399	355
10	0. 059	0, 120	0, 181	0. 242	0, 301	0, 338	0, 412	350
15	0. 058	0, 119	0, 181	0. 245	0, 308	0, 349	0, 430	345
20	0. 057	0, 117	0, 179	0. 243	0, 309	0, 354	0, 441	340
25	0. 054	0, 112	0, 175	0. 239	0, 306	0, 353	0, 444	335
30	0. 050	0, 106	0, 166	0. 232	0, 300	0, 349	0, 440	330
35	0. 045	0, 097	0, 155	0. 219	0, 287	0, 339	0, 432	325
40	0. 039	0, 087	0, 141	0. 202	0, 270	0, 321	0, 418	320
45	0. 032	0, 074	0, 124	0. 184	0, 248	0, 298	0, 395	315
50	0. 024	0, 059	0, 103	0. 158	0, 211	0, 271	0, 364	310
55	0. 015	0, 042	0, 080	0. 129	0, 188	0, 237	0, 329	305
60	0. 006	0, 024	0, 055	0. 097	0, 150	0, 196	0, 295	300
65	0A004	0, 005	0, 027	0. 054	0, 208	0, 150	0, 234	295
70	0. 015	0A016	0A003	0. 018	0, 063	0, 089	0, 157	290
75	0. 026	0, 038	0, 035	0A028	0, 013	0, 046	0, 116	285
80	0. 038	0, 062	0, 069	0. 062	0A040	0A014	0, 048	280
85	0. 050	0, 086	0, 105	0. 109	0, 096	0, 084	0A024	275
90	0. 063	0, 110	0, 141	0. 157	0, 155	0, 143	0, 101	270
95	0. 075	0, 135	0, 178	0. 205	0, 215	0, 184	0, 182	265
100	0. 087	0, 160	0, 216	0. 265	0, 276	0, 282	0, 265	160
105	0. 100	0, 185	0, 253	0. 304	0, 337	0, 353	0, 349	255
110	0. 112	0, 209	0, 289	0. 353	0, 399	0, 415	0, 414	250
115	0. 123	0, 233	0, 326	0. 402	0, 460	0, 496	0, 520	245
120	0. 134	0, 256	0, 361	0. 449	0, 520	0, 566	0, 604	240
125	0. 145	0, 277	0, 394	0. 495	0, 579	0, 636	0, 688	235
130	0. 155	0, 298	0, 426	0. 533	0, 635	0, 793	0, 768	230
135	0. 163	0, 316	0, 456	0. 580	0, 688	0, 767	0, 848	225
140	0. 171	0, 333	0, 481	0. 618	0, 738	0, 819	0, 923	220
145	0. 179	0, 349	0, 507	0. 652	0, 883	0, 883	0, 992	215
150	0. 185	0, 363	0, 537	0. 684	0, 824	0, 934	1, 057	210
155	0. 190	0, 374	0, 549	0. 712	0, 862	0, 981	1, 114	205
160	0. 194	0, 383	0, 564	0. 736	0, 895	0, 022	1, 168	200
165	0. 197	0, 391	0, 577	0. 754	0, 922	0, 058	1, 215	195
180	0. 199	0, 396	0, 588	0. 769	0, 943	0, 086	1, 254	190
175	0. 200	0, 399	0, 594	0. 771	0, 962	0, 111	1, 286	185
170	0. 201	0, 401	0, 597	0. 789	0, 975	0, 129	1, 312	180
Degrees of Equation.	Sub 177	Sub 174	Sub 171	Sub 168	Sub 162	Sub 162	Sub 159	Degrees of Equation.

A Compounded Table of the ☾ Evection and Variation.

Degrees of Equation.	3 Adde	6 Adde	9 Adde	12 Adde	15 Add	18 Adde	21 Add	Degrees of Equation.
180	0,201	0,401	0,597	0,789	0,975	1,129	1,312	180
185	0,200	0,401	0,599	0,794	0,981	1,139	1,331	175
190	0,198	0,398	0,597	0,794	0,984	1,145	1,341	170
195	0,195	0,394	0,593	0,794	0,983	1,146	1,346	165
200	0,192	0,387	0,585	0,782	0,976	1,143	1,346	160
205	0,187	0,380	0,575	0,770	0,964	1,133	1,338	155
210	0,182	0,371	0,562	0,755	0,948	1,117	1,323	150
215	0,176	0,359	0,547	0,736	0,928	1,096	1,300	145
220	0,169	0,347	0,529	0,715	0,903	1,071	1,275	140
225	0,162	0,333	0,509	0,690	0,875	1,041	1,242	135
230	0,154	0,317	0,487	0,663	0,843	1,006	1,204	130
235	0,145	0,300	0,463	0,633	0,797	0,967	1,161	125
240	0,136	0,283	0,438	0,600	0,768	0,924	1,112	120
245	0,127	0,265	0,412	0,566	0,727	0,878	1,059	115
250	0,117	0,246	0,384	0,530	0,784	0,829	1,002	110
255	0,107	0,227	0,355	0,493	0,638	0,778	0,943	105
260	0,097	0,206	0,326	0,454	0,591	0,724	0,880	100
265	0,087	0,186	0,295	0,414	0,542	0,668	0,815	95
270	0,076	0,165	0,264	0,374	0,492	0,611	0,748	90
275	0,066	0,144	0,237	0,331	0,441	0,552	0,679	85
280	0,055	0,121	0,202	0,291	0,389	0,493	0,609	80
285	0,045	0,101	0,170	0,249	0,337	0,433	0,538	75
290	0,035	0,082	0,140	0,209	0,286	0,372	0,466	70
295	0,025	0,062	0,109	0,169	0,234	0,312	0,394	65
300	0,016	0,043	0,078	0,126	0,183	0,253	0,322	60
305	0,006	0,023	0,049	0,087	0,133	0,194	0,252	55
310	0,002	0,004	0,021	0,048	0,084	0,136	0,176	50
315	0,011	0,013	0,005	0,011	0,037	0,080	0,114	45
320	0,019	0,030	0,031	0,025	0,009	0,026	0,048	40
325	0,027	0,045	0,056	0,058	0,052	0,015	0,015	35
330	0,034	0,060	0,079	0,091	0,093	0,075	0,072	30
335	0,040	0,073	0,100	0,120	0,132	0,122	0,134	25
340	0,045	0,085	0,119	0,147	0,168	0,166	0,187	20
345	0,050	0,096	0,136	0,171	0,200	0,206	0,238	15
350	0,054	0,105	0,151	0,192	0,229	0,241	0,284	10
355	0,057	0,111	0,161	0,210	0,253	0,273	0,325	05
360	0,059	0,116	0,171	0,224	0,272	0,296	0,359	00
Deg. of Equated Anomaly.	Add. 177	Add 174	Add 171	Add 168	Add 165	Add 162	Add 159	Degrees of Equated Anomaly.

A Compounded Table of the Evection and Variation.

Deg. of Eq. Anomaly.	21 Sub.	24 Sub	27 Sub	30 Sub	33 Sub	36 Sub	39 Sub	Deg. of Eq. Anomaly.
0	0,359	0,396	0,427	0,454	0,478	0,491	0.499	360
5	0,399	0,433	0,473	0,509	0,540	0,565	0.585	355
10	0,412	0,461	0,511	0,556	0,596	0,632	0.661	350
15	0,430	0,487	0,542	0,595	0,644	0,689	0.728	345
20	0,441	0,505	0,567	0,626	0,683	0,737	0.786	340
25	0,444	0,513	0,581	0,649	0,714	0,775	0.829	335
30	0,440	0,513	0,588	0,662	0,734	0,805	0.870	330
35	0,433	0,508	0,585	0,664	0,744	0,822	0.896	325
40	0,418	0,496	0,575	0,659	0,742	0,827	0.910	320
45	0,395	0,475	0,559	0,647	0,734	0,822	0.910	315
50	0,364	0,445	0,532	0,622	0,715	0,810	0.902	310
55	0,329	0,409	0,495	0,589	0,684	0,784	0.884	305
60	0,295	0,365	0,452	0,545	0,642	0,747	0.850	300
65	0,234	0,312	0,398	0,493	0,593	0,697	0.805	295
70	0,157	0,250	0,336	0,430	0,531	0,639	0.749	290
75	0,116	0,184	0,265	0,356	0,457	0,566	0.681	285
80	0,048	0,112	0,289	0,277	0,374	0,483	0.598	280
85	0A024	0,033	0,107	0,189	0,284	0,389	0.503	275
90	0,101	0A051	0,013	0,104	0,184	0,289	0.402	270
95	0,182	0,143	0A083	0A010	0,077	0,178	0.289	265
100	0,265	0,233	0,185	0,118	0A037	0,059	0.166	260
105	0,349	0,327	0,289	0,232	0,157	0A067	0.036	255
110	0,434	0,424	0,395	0,348	0,290	0,199	0A102	250
115	0,520	0,521	0,503	0,465	0,410	0,336	0.246	245
120	0,604	0,618	0,611	0,584	0,538	0,481	0.392	240
125	0,688	0,713	0,718	0,703	0,668	0,613	0.540	235
130	0,768	0,807	0,824	0,821	0,798	0,754	0.690	230
135	0,848	0,899	0,928	0,937	0,925	0,892	0.839	225
140	0,923	0,986	1,029	1,051	1,051	0,829	0.987	220
145	0,992	1,068	1,124	1,159	1,171	1,163	1.133	215
150	1,057	1,146	1,214	1,273	1,288	1,292	1.274	210
155	1,114	1,217	1,280	1,358	1,401	1,414	1.410	205
160	1,168	1,280	1,353	1,445	1,499	1,529	1.537	200
165	1,215	1,337	1,441	1,525	1,590	1,634	1.657	195
170	1,254	1,387	1,502	1,598	1,675	1,729	1.764	190
175	1,286	1,427	1,554	1,662	1,750	1,817	1.864	185
180	1,312	1,462	1,595	1,714	1,815	1,894	1.953	180
Deg. of Equated Anomaly.	Sub. 159	Sub 156	Sub 153	Sub 150	Sub 147	Sub 144	Sub 141	Degree of Equated Anomaly.

A Compounded Table of the ☾ Evection and Variation.

Degrees of Eq: Anom.	12 Adde	24 Adde	27 Adde	30 Adde	33 Add	36 Adde	39 Add	Degrees of Eq: Anom.
180	1,321	1,462	1,595	1,714	1,815	1,894	1,953	180
185	1,331	1,488	1,530	1,758	1,866	1,959	2,031	175
190	1,341	1,506	1,656	1,791	1,911	2,011	2,093	170
195	1,346	1,513	1,671	1,816	1,943	2,053	2,146	165
200	1,346	1,517	1,678	1,828	1,953	2,084	2,186	160
205	1,338	1,514	1,680	1,833	1,974	2,101	2,214	155
210	1,323	1,502	1,672	1,831	1,978	2,109	2,227	150
215	1,300	1,482	1,665	1,818	1,970	2,109	2,232	145
220	1,275	1,455	1,629	1,795	1,952	2,096	2,226	140
225	1,242	1,422	1,619	1,765	1,923	2,072	2,208	135
230	1,204	1,382	1,557	1,725	1,886	2,033	2,177	130
235	1,161	1,336	1,509	1,678	1,840	1,993	2,136	125
240	1,112	1,285	1,456	1,623	1,785	1,939	2,085	120
245	1,055	1,227	1,396	1,561	1,722	1,876	2,023	115
250	1,002	1,165	1,329	1,491	1,651	1,805	1,952	110
255	0.943	1,000	1,258	1,416	1,576	1,725	1,872	105
260	0,880	1,031	1,184	1,337	1,4[illegible]9	1,637	1,782	100
265	0,815	0,959	1,106	1,253	1,401	1,544	1,687	95
270	0,748	0,884	1,024	1,170	1,307	1,448	1,586	90
275	0,679	0,807	0,939	1,073	1,210	1,345	1,480	85
280	0,609	0,718	0,852	0,979	1,108	1,238	1,368	80
285	0,538	0,648	0,763	0,882	1,004	1,128	1,252	75
290	0,466	0,567	0,674	0,784	0,898	1,015	1,132	70
295	0,394	0,485	0,564	0,685	0,791	0,899	1,010	65
300	0,322	0,403	0,485	0,584	0,682	0,783	0,887	60
305	0,252	0,323	0,401	0,484	0,573	0,665	0,774	55
310	0,176	0,243	0,312	0,384	0,464	0,547	0,645	50
315	0,114	0,165	0,223	0,286	0,397	0,430	0,508	45
320	0,048	0,089	0,137	0,189	0,250	0,314	0,384	40
325	0S015	0,015	0,052	0,094	0,145	0,200	0,260	35
330	0,072	0S044	0S030	0,000	0,043	0,089	0,039	30
335	0,134	0,123	0,107	0S084	0S053	0S019	0,020	25
340	0,187	0,188	0,180	0,168	0,147	0,124	0S093	20
345	0,238	0,248	0,250	0.247	0,242	0,223	0,203	15
350	0,284	0,303	0,316	0,322	0,323	0,318	0,305	10
355	0,325	0,353	0,386	0,392	0,403	0,407	0,406	05
360	0,359	0,396	0,427	0,454	0,475	0,491	0,499	00
Degs of Equated Anomaly.	Add 159	Add 156	Add 153	Add 150	Add 147	Add 144	Add 141	Degrees of Equated Anomaly.

A Compounded Table of the ☾ Evection and Variation.

Equated Anomaly.	39 Sub:	41 Sub.	45 Sub	48 Sub	51 Sub	54 Sub	57 Sub:	Equated Anomaly.
0	0.499	0,502	0,501	0,495	0,481	0,468	0,447	360
5	0.585	0,599	0,606	0,610	0,609	0,600	0,591	355
10	0.661	0,686	0,705	0,719	0,726	0,729	0,651	350
15	0.728	0,763	0,793	0,818	0,837	0,768	0,854	345
20	0.786	0,831	0,870	0,906	0,935	0,959	0,976	340
25	0.829	0,887	0,938	0,983	1,023	1,057	1,085	335
30	0.870	0,933	0,991	1,049	1,099	1,144	1,182	330
35	0.898	0,969	1,037	1,101	1,162	1,218	1,266	325
40	0.910	0,99	1,069	1,143	1,213	1,274	1,337	320
45	0.910	1,001	1,087	1,171	1,252	1,327	1,401	315
50	0.902	0,996	1,090	1,185	1,274	1,360	1,440	310
55	0.884	0,982	1,082	1,182	1,282	1,378	1,467	305
60	0.850	0,958	1,066	1,171	1,275	1,373	1,480	300
65	0.805	0,918	1,031	1,146	1,259	1,367	1,473	295
70	0.749	0,863	0,974	1,103	1,225	1,344	1,455	290
75	0.681	0,800	0,922	1,110	1,175	1,301	1,426	285
80	0.598	0,771	0,84	0,979	1,109	1,243	1,375	280
85	0.503	0,628	0,758	0,894	1,033	1,167	1,307	275
90	0.402	0,524	0,655	0,794	0,937	1,063	1,228	270
95	0.289	0,412	0,542	0,680	0,827	0,977	1,128	265
100	0.166	0,292	0,418	0,558	0,704	0,845	1,053	260
105	0.036	0,153	0,282	0,422	0,568	0,705	1,882	255
110	0A102	0,011	0,137	0,275	0,423	0,579	0,742	250
115	0.246	0A137	0A016	0,119	0,266	0,442	0,591	245
120	0.392	0,292	0,177	0A245	0,091	0,254	0,417	240
125	0.540	0,449	0,341	0,216	0A076	0,077	0,239	235
130	0.690	0,607	0,537	0,389	0,256	0A108	0,052	230
135	0.839	0,766	0,675	0,565	0,448	0,296	0A141	225
140	0.987	0,925	0,843	0,742	0,623	0,487	0,337	220
145	1.133	1,081	1,010	0,918	0,808	0,680	0,536	215
150	1.274	1,235	1,174	1,094	0,992	0,872	0,737	210
155	1.410	1,383	1,334	1,263	1,172	1,062	0,935	205
160	1.537	1,541	1,488	1,429	1,350	1,249	1,131	200
165	1.657	1,656	1,633	1,587	1,520	1,431	1,323	195
170	1.764	1,778	1,768	1,741	1,682	1,605	1,509	190
175	1.864	1,888	1,892	1,875	1,833	1,769	1,685	185
180	1.953	1,991	2,005	1,999	1,973	1,923	1,851	180
Equated Anomaly.	Sub	Sub	Sub	Sub	Sub	Sub	Sub	Equated Anomaly.
	141	138	135	132	129	126	123	

A Mathematical Table of the Equation and Variation.

Equated Anomaly.	52 Add	53 Add	54 Add	55 Add	56 Add	57 Add	58 Add	59 Add	Equated Anomaly.
180	1,953	1,991	2,005	1.999	1,973	1,923	1,851	1,760	180
185	2.031	2,082	2,108	2.103	2,098	2,063	2,004	1,925	175
190	2,092	2,157	2,199	2.218	2,215	2,180	2,142	2,070	170
195	2,146	2,218	2,272	2.306	2,317	2,303	2,270	2,205	165
200	2,186	2,269	2,334	2.376	2,402	2,403	2,382	2,320	160
205	2,214	2,307	2,382	2.436	2,471	2,484	2,479	2,425	155
210	2,227	2,330	2,416	2.482	2,526	2,552	2,555	2,510	150
215	2,232	2,340	2,433	2.507	2,568	2,603	2,620	2,585	145
220	2,226	2,34	2,441	2.523	2,590	2,639	2,668	2,640	140
225	2,208	2,330	2,437	2.529	2,600	2,673	2,696	2,685	135
230	2,177	2,306	2,419	2.518	2,600	2,663	2,708	2,710	130
235	2,136	2,267	2,387	2.494	2,583	2,655	2,712	2,725	125
240	2,085	2,220	2,343	2.454	2,551	2,632	2,696	2,720	120
245	2,023	2,161	2,288	2.403	2,500	2,591	2,666	2,695	115
250	1.952	2,091	2,219	2.340	2,446	2,539	2,572	2,660	110
255	1.872	2,012	2,143	2.265	2,375	2,473	2,558	2,605	105
260	1.782	1,923	2,056	2.179	2,292	2,393	2,484	2,540	100
265	1.687	1,825	1,957	2.083	2,198	2,302	2,387	2,455	95
270	1.586	1,721	1,851	1.975	2,094	2,190	2,297	2,360	90
275	1.480	1,611	1,739	1.861	1,975	2,085	2,186	2,255	85
280	1.368	1,496	1,620	1.741	1,853	1,962	2,063	2,140	80
285	1.252	1,375	1,496	1.614	1,726	1,832	1,933	2,015	75
290	1.132	1,250	1,366	1.480	1,590	1,695	1,795	1,875	70
295	1.010	1,111	1,233	1.342	1,449	1,552	1,650	1,730	65
300	0.887	0,991	1,096	1.200	1,303	1,402	1,499	1,580	60
305	0.774	0,884	0,957	1.056	1,153	1,249	1,342	1,425	55
310	0.645	0,725	0,814	0.909	1,001	1,094	1,181	1,260	50
315	0.508	0,590	0,675	0.761	0,872	0,933	1,018	1,095	45
320	0.384	0,457	0,537	0.621	0,691	0,784	0,852	0,920	40
325	0.260	0,325	0,493	0.462	0,516	0,609	0,684	0,745	35
330	0,019	0,195	0,254	0.323	0,380	0,446	0,515	0,570	30
335	0.020	0,067	0,117	0.170	0,227	0,286	0,348	0,405	25
340	0S093	0S057	0S016	0.028	0,076	0,128	0,183	0,230	20
345	0.303	0,177	0,146	0S110	0S071	0S028	0,019	0,065	15
350	0,303	0,291	0,270	0.245	0,214	0,179	0S141	0,100	10
355	0,406	0,400	0,388	0.373	0,352	0,327	0,296	0,265	05
360	0,499	0,502	0,501	0.495	0,481	0,468	0,447	0,420	000
Equated Anomaly.	Add 131	138	135	130	129	126	119	Add	Equated Anomaly.

A Compounded Table of the Evection and Variation.

Equated Anomaly.	57 Sub	58 Sub	59 Sub	58 Sub	☉ Sub	57 Sub	57 Sub	Equated Anomaly.
0	0.447	0,421	0,391	0.358	0,329	0,280	0,237	360
5	0.591	0,574	0,552	0.550	0,496	0,462	0,424	355
10	0.651	0,719	0,606	0.688	0,665	0,619	0,607	350
15	0.854	0,856	0,752	0.843	0,828	0,809	0,784	345
20	0,976	0,986	0,990	0.990	0,981	0,972	0,954	340
25	1.085	1,107	1,121	1.127	1,129	1,126	1,116	335
30	1.182	1,214	1,240	1.258	1,268	1,227	1,269	330
35	1.266	1,309	1,345	1.374	1,396	1,401	1,413	325
40	1.337	1,392	1,348	1.477	1,508	1,593	1,549	320
45	1.401	1,459	1,517	1.567	1,608	1,642	1,668	315
50	1.440	1,513	1,580	1.640	1,694	1,739	1,774	310
55	1.467	1,589	1,631	1.700	1,758	1,820	1,866	305
60	1.480	1,575	1,663	1.746	1,819	1,885	1,941	300
65	1.473	1,579	1,680	1.772	1,857	1,936	2,001	295
70	1.455	1,569	1,676	1.781	1,878	1,966	2,046	290
75	1.426	1,549	1,663	1.772	1,878	1,981	2,070	285
80	1.375	1,506	1,63	1.754	1,966	1,973	2,074	280
85	1.307	1,448	1,562	1.713	1,839	1,953	2,074	275
90	1.228	1,373	1,514	1.655	1,749	1,920	2,035	270
95	1.128	1,282	1,433	1.578	1,622	1,863	1,993	265
100	1.013	1,172	1,331	1.487	1,639	1,785	1,929	260
105	0.882	1,045	1,211	1.375	1,538	1,696	1,845	255
110	0.742	0,907	1,074	1.246	1,424	1,583	1,744	250
115	0.591	0,755	0,894	1.101	1,275	1,451	1,621	245
120	0.417	0,589	0,765	0.945	1,124	1,303	1,479	240
125	0.239	0,411	0,589	0.772	0,957	1,194	1,325	235
130	0.052	0,223	0,402	0.587	0,775	0,973	1,156	230
135	0A141	0,026	0,204	0.390	0,581	0,776	0,970	225
140	0.337	0A175	0,000	0.184	0,377	0,574	0,772	220
145	0.536	0,378	0A208	0A026	0,163	0,361	0,563	215
150	0.737	0,584	0,419	0.240	0A063	0,142	0,344	210
155	0.935	0,790	0,631	0.458	0,273	0A080	0,119	205
160	1.131	0,994	0,842	0.675	0,491	0,306	0A107	200
165	1.323	1,195	1,052	0.891	0,717	0,533	0,337	195
170	1.509	1,392	1,257	1.104	0,937	0,883	0,568	190
175	1.685	1,580	1,455	1.322	1,153	0,979	0,784	185
180	1.853	1,758	1,645	1.513	1,363	1,198	1,019	180
Equated Anomaly.	Sub 123	Sub 120	Sub 117	Sub 114	Sub 111	Sub 108	Sub 105	Equated Anomaly.

A Compounded Table of the Æquation and Variation.

Equated Anomaly.	57 Adde.	62 Adde	63 Adde	66 Adde	69 Adde	72 Adde	75 Add.	Equated Anomaly.
180	1,851	1,758	1,645	1,513	1,363	1,198	1,019	180
185	2,004	1,924	1,829	1,722	1,564	1,409	1,238	175
190	2,142	2,07[illegible]	1,990	1,880	1,753	1,608	1,448	170
195	2,270	2,214	2,139	2,044	1,930	1,796	1,646	165
200	2,383	2,341	2,278	2,191	2,090	1,970	1,831	160
205	2,479	2,451	2,401	2,319	2,238	2,126	2,001	155
210	2,555	2,541	2,507	2,448	2,369	2,272	2,154	150
215	2,620	2,617	2,591	2,548	2,483	2,400	2,296	145
220	2,668	2,675	2,663	2,629	2,576	2,509	2,419	140
225	2,696	2,717	2,717	2,695	2,656	2,596	2,520	135
230	2,708	2,738	2,748	2,744	2,715	2,668	2,604	130
235	2,712	2,748	2,767	2,769	2,756	2,723	2,669	125
240	2,696	2,744	2,774	2,781	2,775	2,755	2,711	120
245	2,660	2,758	2,760	2,782	2,784	2,199	2,739	115
250	2,572	2,682	2,727	2,761	2,774	2,773	2,750	110
255	2,558	2,628	2,684	2,724	2,748	2,755	2,746	105
260	2,484	2,561	2,623	2,687	2,701	2,722	2,721	100
265	2,387	2,478	2,547	2,601	2,640	2,666	2,677	95
270	2,297	2,383	2,458	2,517	2,565	2,600	2,616	90
275	2,186	2,276	2,354	2,419	2,473	2,514	2,541	85
280	2,063	2,155	2,238	2,309	2,368	2,415	2,449	80
285	1,933	2,025	2,109	2,185	2,241	2,303	2,348	75
290	1,795	1,888	1,973	2,048	2,117	2,176	2,224	70
295	1,650	1,743	1,829	1,904	1,975	2,036	2,088	65
300	1,499	1,590	1,676	1,754	1,828	1,889	1,944	60
305	1,342	1,431	1,516	1,595	1,663	1,733	1,791	55
310	1,181	1,268	1,350	1,416	1,502	1,569	1,629	50
315	1,018	1,100	1,181	1,257	1,329	1,397	1,459	45
320	0,852	0,930	1,007	1,081	1,152	1,219	1,284	40
325	0,684	0,758	0,831	0,902	0,971	1,037	1,099	35
330	0,515	0,584	0,654	0,717	0,787	0,841	0,913	30
335	0,348	0,410	0,474	0,538	0,602	0,664	0,723	25
340	0,183	0,238	0,295	0,333	0,424	0,473	0,531	20
345	0,019	0,067	0,119	0,172	0,226	0,282	0,337	15
350	0,141	0,098	0,059	0,040	0,040	0,092	0,144	10
355	0,296	0,262	0,224	0,184	0,141	0,095	0,048	05
360	0,447	0,421	0,391	0,358	0,320	0,280	0,237	00
Equated Anomaly.	Add	Add	Add	Add	Add	Add	Add	Equated Anomaly.
	113	120	117	114	111	108	105	

A Compounded Table of the Æquation and Variation.

Equated Anomaly.	75 Sub:	78 Sub.	81 Sub	84 Sub	87 Sub	90 Sub		Equated Anomaly.
0	0.237	0,193	0,146	0,099	0,050	0,000		360
5	0.424	0,384	0,341	0,295	0,249	0,201		355
10	0.607	0,571	0,532	0,490	0,446	0,399		350
15	0.784	0,754	0,720	0,682	0,640	0,596		345
20	0.954	0,931	0,902	0,869	0,831	0,789		340
25	1.116	1,100	1,078	1,050	1,016	1,978		335
30	1.269	1,260	1,245	1,224	1,198	1,161		330
35	1.413	1,412	1,403	1,391	1,366	1,337		325
40	1.549	1,555	1,553	1,544	1,528	1,505		320
45	1.668	1,686	1,694	1,692	1,681	1,664		315
50	1.774	1,801	1,819	1,827	1,826	1,813		310
55	1.866	1,903	1,930	1,947	1,955	1,953		305
60	1.941	1,990	2,028	2,054	2,071	2,077		300
65	2.001	2,059	2,100	2,146	2,171	2,186		295
70	2.046	2,115	2,171	2,213	2,257	2,282		290
75	2.070	2,151	2,221	2,279	2,325	2,359		285
80	2.074	2,170	2,249	2,319	2,378	2,422		280
85	2.074	2,165	2,259	2,342	2,411	2,467		275
90	2.035	2,150	2,250	2,342	2,426	2,493		270
95	1.993	2,118	2,229	2,329	2,418	2,498		265
100	1.929	2,067	2,186	2,300	2,397	2,487		260
105	1.845	1,987	2,123	2,242	2,362	2,463		255
110	1.744	1,897	2,040	2,176	2,302	2,414		250
115	1.621	1,786	1,942	2,087	2,221	2,347		245
120	1.479	1,654	1,821	1,979	2,127	2,259		240
125	1.325	1,504	1,681	1,848	2,008	2,155		235
130	1.156	1,344	1,524	1,699	1,870	2,000		230
135	0.970	1,169	1,355	1,539	1,714	1,881		225
140	0.772	0,977	1,168	1,360	1,547	1,722		220
145	0.563	0,766	0,968	1,166	1,367	1,547		215
150	0.344	0,550	0,755	0,960	1,161	1,355		210
155	0.119	0,323	0,533	0,742	0,949	1,149		205
160	0A107	0,197	0,304	0,515	0,726	0,932		200
165	0.337	0A068	0,073	0,283	0,495	0,705		195
170	0.468	0,367	0A161	0,049	0,261	0,473		190
175	0.784	0,599	0,397	0A188	0,025	0,238		185
180	1.019	0,848	0,630	0,424	0A214	0,000		180
Equated Anomaly.	Sub	Sub	Sub	Sub	Sub	Sub		Equated Anomaly.
	105	102	099	96	93	90		

A Compounded Table of the ☾ Evection and Variation.

Equated Anomaly.	75 Adde	78 Adde	81 Adde	84 Adde	87 Adde	90 Adde		Equated Anomaly.
180	1,019	0,828	0,630	0,424	0,214	0,000		180
185	1,238	1,054	0,860	0,658	0,450	0,238		175
190	1,448	1,271	1,085	0,888	0,684	0,473		170
195	1,646	1,480	1,302	1,112	0,912	0,705		165
200	1,831	1,682	1,507	1,326	1,133	0,932		160
205	2,001	1,858	1,699	1,527	1,343	1,146		155
210	2,154	2,022	1,886	1,716	1,540	1,355		150
215	2,296	2,175	2,035	1,886	1,719	1,547		145
220	2,149	2,310	2,184	2,044	1,887	1,722		140
225	2,520	2,426	2,313	2,184	2,040	1,881		135
230	2,604	2,518	2,412	2,307	2,175	2,000		130
235	2,966	2,598	2,509	2,405	2,294	2,155		125
240	2,711	2,657	2,580	2,489	2,380	2,259		120
245	2,739	2,661	2,633	2,553	2,456	2,347		115
250	2,750	2,712	2,661	2,596	2,513	2,414		110
255	2,746	2,719	2,674	2,616	2,552	2,463		105
260	2,721	2,705	2,674	2,626	2,561	2,487		100
265	2,677	2,673	2,652	2,616	2,566	2,498		95
270	2,616	2,621	2,611	2,588	2,547	2,493		90
275	2,541	2,554	2,546	2,538	2,511	2,467		85
280	2,449	2,471	2,479	2,473	2,453	2,422		80
285	2,343	2,371	2,388	2,392	2,383	2,359		75
290	2,224	2,259	2,282	2,294	2,294	2,282		70
295	2,088	2,132	2,163	2,182	2,190	2,186		65
300	1,944	1,990	2,028	2,057	2,072	2,077		60
305	1,791	1,840	1,882	1,915	1,939	1,953		55
310	1,629	1,682	1,725	1,764	1,792	1,813		50
315	1,459	1,515	1,561	1,605	1,638	1,664		45
320	1,281	1,335	1,391	1,436	1,474	1,505		40
325	1,099	1,157	1,211	1,260	1,302	1,337		35
330	0,913	0,971	1,026	1,076	1,124	1,161		30
335	0,723	0,780	0,835	0,887	0,934	0,978		25
340	0,531	0,587	0,638	0,694	0,743	0,789		20
345	0,337	0,392	0,447	0,499	0,548	0,596		15
350	0,144	0,196	0,248	0,300	0,351	0,399		10
355	0S048	0S000	0S050	0S108	0,149	0,201		05
360	0,273	0,193	0,146	0,099	0S050	0,000		00
Equated Anomaly.	Add 105	Add 102	Add 99	Add 96	Add 93	Add 90		Equated Anomaly.

A Table of the Equations of Nodes and Moons Latitude.

		Eq: Nod: Adde	Scruples of prop.	Latit. ☽	Eccesse Adde		
		D. Parts.	Parts.	D. parts.	Parts.		
0	180	0,00000	,00000	0,00000	,00000	180	360
1	181	0,06389	,00030	0,08694	,00556	179	359
2	182	0,12750	,00120	0,17361	,01111	178	358
3	183	0,19083	,00274	0,26000	,01639	177	357
4	184	0,25389	,00487	0,34639	,02194	176	356
5	185	0,31667	,00760	0,43278	,02750	175	355
6	186	0,37944	,01093	0,51917	,03305	174	354
7	187	0,44139	,01485	0,60528	,03861	173	353
8	188	0,50250	,01937	0,69139	,04389	172	352
9	189	0,56305	,02447	0,77722	,04917	171	351
10	190	0,62305	,03015	0,86278	,05472	170	350
11	191	0,68222	,03641	0,94806	,06000	169	349
12	192	0,74056	,04323	1,03972	,06528	168	348
13	193	0,79778	,05060	1,11778	,07083	167	347
14	194	0,85389	,05853	1,20222	,07611	166	346
15	195	0,90889	,05699	1,28611	,08139	165	345
16	196	0,96307	,07598	1,36972	,08694	164	344
17	197	1,01556	,08548	1,45278	,09222	163	343
18	198	1,06067	,09549	1,53556	,09750	162	342
19	199	1,11639	,10599	1,61778	,10278	161	341
20	200	1,16472	,11698	1,69944	,10778	160	340
21	201	1,21167	,12843	1,78033	,11305	159	339
22	202	1,25694	,14033	1,86139	,11833	158	338
23	203	1,30056	,15267	1,94167	,12333	157	337
24	204	1,34250	,16543	2,02139	,12833	156	336
25	205	1,38944	,17861	2,10028	,13333	155	335
26	206	1,42111	,19217	2,17861	,13833	154	334
27	207	1,45778	,20611	2,25639	,14306	153	333
28	208	1,49278	,22387	2,33333	,14806	152	332
29	209	1,52611	,23504	2,40944	,15306	151	331
30	210	1,55778	,25000	2,48500	,15778	150	330
		Subst.					

A Table of the Æquations of Nodes and Moons Latitude.

		Eq: Nod: Adde		Scruples of prop.	Latit. ☽		Eccentr. Adde		
		D.	Parts.	Parts.	D.	parts.	Parts.		
30	210	1,	55778	,25000	2,48500	,	15778	150	330
31	211	1,	58667	,26526	2,56000	,	16150	149	329
32	212	1,	61306	,28081	2,63417	,	16722	148	328
33	213	1,	63667	,29663	2,70722	,	17167	147	327
34	214	1,	65861	,31270	2,77944	,	17639	146	326
35	215	1,	67833	,32899	2,85111	,	18088	145	325
36	216	1,	69583	,34549	2,92194	,	18528	144	324
37	217	1,	71222	,36218	2,99167	,	18972	143	323
38	218	1,	72722	,37904	3,06056	,	19417	142	322
39	219	1,	74139	,39640	3,12861	,	19881	141	321
40	220	1,	75222	,41318	3,19556	,	20306	140	320
41	221	1,	75944	,43041	3,26167	,	20722	139	319
42	222	1,	76389	,44774	3,32667	,	21139	138	318
43	223	1,	76556	,46512	3,39056	,	21556	137	317
44	224	1,	76639	,48255	3,45361	,	21944	136	316
45	225	1,	76667	,50000	3,51564	,	22346	135	315
46	226	1,	76472	,51744	3,57639	,	22722	134	314
47	227	1,	76000	,53487	3,63611	,	23111	133	313
48	228	1,	75361	,55226	3,69500	,	23472	132	312
49	229	1,	74472	,56953	3,75194	,	23833	131	311
50	230	1,	73333	,58682	3,80833	,	24194	130	310
51	231	1,	71944	,60395	3,86444	,	24556	129	309
52	232	1,	70389	,62096	3,91917	,	24917	128	308
53	233	1,	68611	,63781	3,97194	,	25250	127	307
54	234	1,	66639	,65451	4,02306	,	25583	126	306
55	235	1,	64500	,67101	4,07333	,	25917	125	305
56	236	1,	62167	,68730	4,12250	,	26194	124	304
57	237	1,	59611	,70336	4,17083	,	26500	123	303
58	238	1,	56889	,71918	4,21806	,	26806	122	302
59	239	1,	53971	,73475	4,26306	,	27083	121	301
60	240	1,	50889	,75000	4,30722	,	27361	120	300
		Subst.							

A Table of the Equations of Node and Moons Latitude.

		Eq. Nod: Add	Scruples of prop.	Latit. D	Eccesse		
		D. Parts.	Parts.	D. Parts.	Parts.		
60	240	1,50889	,75000	4,30722	,27661	120	300
61	241	1,47611	,76496	4,34972	,27639	119	299
62	242	1,44167	,77959	4,39111	,27917	118	298
63	243	1,40583	,79389	4,43139	,28194	117	297
64	244	1,36833	,80783	4,47018	,28444	116	296
65	245	1,32917	,82439	4,50778	,28667	115	295
66	246	1,28833	,83456	4,54389	,28889	114	294
67	247	1,24667	,84732	4,57861	,29111	113	293
68	248	1,20250	,85967	4,61194	,29333	112	292
69	249	1,15750	,87152	4,64389	,29528	111	291
70	250	1,11139	,88302	4,67417	,29750	110	290
71	251	1,06361	,89400	4,70296	,29944	109	289
72	252	1,01417	,90450	4,73056	,30139	108	288
73	253	0,96389	,91451	4,75639	,30333	107	287
74	254	0,91306	,92402	4,78131	,30500	106	286
75	255	0,86167	,93301	4,80500	,30639	105	285
76	256	0,80889	,94147	4,82639	,30750	104	284
77	257	0,75500	,94939	4,84694	,30861	103	283
78	258	0,70000	,95177	4,86611	,30944	102	282
79	259	0,64444	,96359	4,88333	,31056	101	281
80	260	0,58833	,96934	4,89917	,31167	100	280
81	261	0,53139	,97552	4,91361	,31250	99	279
82	262	0,47389	,98063	4,92667	,31333	98	278
83	263	0,41583	,98514	4,93806	,31417	97	277
84	264	0,35722	,98907	4,94778	,31472	96	276
85	265	0,29833	,99240	4,95611	,31528	95	275
86	266	0,23917	,99513	4,96278	,31556	94	274
87	267	0,17944	,99726	4,96833	,31583	93	273
88	268	0,11972	,99878	4,97167	,31613	92	272
89	269	0,06000	,99964	4,97389	,31639	91	271
90	270	0,00000	,00000	4,97500	,31667	90	270
		Subt.					

A Table of the Moons Reductions to the Ecliptick.

		Reduct. Subst. D.parts.		
0	180	,00000	180	360
1	181	,00417	179	359
2	182	,00833	178	358
3	183	,01250	177	357
4	184	,01639	176	356
5	185	,02028	175	355
6	186	,02417	174	354
7	187	,02833	173	353
8	188	,03222	172	352
9	189	,03611	171	351
10	190	,04000	170	350
11	191	,04389	169	349
12	192	,04778	168	348
13	193	,05167	167	347
14	194	,05528	166	346
15	195	,05889	165	345
16	196	,06194	164	344
17	197	,06556	163	343
18	198	,06889	162	342
19	199	,07194	161	341
20	200	,07500	160	340
21	201	,07806	159	339
22	202	,08111	158	338
23	203	,08389	157	337
24	204	,08694	156	336
25	205	,08944	155	335
26	206	,09194	154	334
27	207	,09444	153	333
28	208	,09694	152	332
29	209	,09944	151	331
30	210	,10278	150	330
		Adde		

		Reduct. Subst. D.parts.		
30	210	,10167	150	330
31	211	,10333	149	329
32	212	,10500	148	328
33	213	,10667	147	327
34	214	,10806	146	326
35	215	,10972	145	325
36	216	,11111	144	324
37	217	,11222	143	323
38	218	,11306	142	322
39	219	,11417	141	321
40	220	,11500	140	320
41	221	,11556	139	319
42	222	,11583	138	318
43	223	,11611	137	317
44	224	,11639	136	316
45	225	,11667	135	315
46	226	,11639	134	314
47	227	,11611	133	313
48	228	,11583	132	312
49	229	,11556	131	311
50	230	,11500	130	310
51	231	,11417	129	309
52	232	,11306	128	308
53	233	,11222	127	307
54	234	,11111	126	306
55	235	,10972	125	305
56	236	,10778	124	304
57	237	,10639	123	303
58	238	,10472	122	302
59	239	,10306	121	301
60	240	,10139	120	300
		Adde		

The Moons Reduction.

		Reduct. Subst. parts.		
60	240	,10139	120	300
61	241	,09917	119	299
62	242	,09667	118	298
63	243	,09417	117	297
64	244	,09167	116	296
65	245	,08917	115	295
66	246	,08667	114	294
67	247	,08361	113	293
68	248	,08083	112	292
69	249	,07778	111	291
70	250	,07472	110	290
71	251	,07167	109	289
72	252	,06833	108	288
73	253	,06528	107	287
74	254	,06167	106	286
75	255	,05861	105	285
76	256	,05500	104	284
77	257	,05139	103	283
78	258	,04750	102	282
79	259	,04389	101	281
80	260	,03972	100	280
81	261	,03583	99	279
82	262	,03194	98	278
83	263	,02806	97	277
84	264	,02389	96	276
85	265	,02000	95	275
86	266	,01611	94	274
87	267	,01250	93	273
88	268	,00833	92	272
89	269	,00417	91	271
90	270	,00000	90	270
		Adde		

The difference of the true ☌ or ☍ from the middle of the Obscuration.

Lat. ☽ D.par	Differ. Parts.
0, 10	,00861
0, 20	,01722
0, 30	,02611
0, 40	,03506
0, 50	,04361
0, 60	,05222
0, 70	,06083
0, 80	,06972
0, 90	,07833
1, 00	,08722
1, 10	,09583
1, 20	,10472
1, 30	,11361
1, 40	,12222
1, 50	,13083
1, 60	,13944

Latitude ☽
- North Desc. / South Asc. } Adde
- North Asc. / South Desc. } Subst.

A Table of the Meane Lunations.

	Yeers	Hours: Parts	Months.	Common.	Bissextile.
				Hours: parts.	Hours: Parts.
	1	255, 18944	complea.		
	2	510, 37889	*January*	0035,26556	0035,26556
	3	056, 83417	*Februa.*	0707,26556	0022,53139
B	4	336, 02361	*March.*	0043,79722	0057,79722
	5	591, 21306	*April.*	0045,06306	0069,06306
	6	137, 66833	*May.*	0080,32889	0104,32889
	7	392, 85778	*Iune.*	0091,59472	0115,59472
B	8	673, 04722	*Iuly.*	0126,86028	0150,86028
	9	218, 50250	*Auguſt*	0162,12611	0186,12611
	10	473, 69194	*Septem.*	0173,39194	0197,39194
	11	020, 14722	*October*	0208,65778	0232,65778
B	12	299, 33667	*Novem*	0219,92361	0243,92361
	13	554, 52611	*Decem.*	0255,18944	0279,18944
	14	100, 98139			
	15	356, 17083	Canonion Syzygiarum.		
B	16	635, 36028		☌	☍
	17	181, 81556		Hours: Parts	Hours: Parts.
	18	437, 00500	I	0708,73417	0354,36722
	19	692, 19444	II	1417,46833	1063,10139
B	20	162, 64972	III	2126,20250	1771,83556
	40	525, 29944	IV	2834,03667	2480,56972
	60	079, 21528	V	3543,67083	3189,30361
	80	341, 86500	VI	4252,40500	3898,03806
	100	604, 51472	VII	4961,13944	4606,77222
	200	500, 29556	VIII	5669,87361	5315,50667
	300	396, 07639			
	400	291, 85694	Epochæ.		
	500	187, 63778	Yeares Compleat.		Hours: Parts.
	600	083, 41861		Christi.	0425,70667
	700	687, 93361		1600	0176,06694
	800	583, 71417		1620	0439,31667
	900	479, 49500		1640	0701,96639
	1000	375, 27583		1660	0255,88194
	2000	041, 81750			
	3000	417, 09333			

Daies	Hours
1	24
2	48
3	72
4	96
5	120
6	144
7	168
8	192
9	216
10	240
11	264
12	288
13	312
14	336
15	360
16	384
17	408
18	432
19	456
20	480
21	504
22	528
23	552
24	576
25	600
26	624
27	648
28	672
29	696
30	720

The Horizontal Parallaxes, Semidiameters, and Hourly motions of the Sun and Moon.

Degrees	Horiz. Paral. ⊙	Semi-diam. ⊙	Hourly motion. ⊙	Semia. Cone Shad.	Horizō. Paralax. ☽	Semi-diam. ☽	Hourly motion ☽	Degrees
	Parts.	Parts.	Parts.	Parts.	Parts.	Parts	Parts.	
0	,03855	,26936	,03972	,22948	,92692	.25964	,49444	360
6	,03859	,26968	,03981	,22980	,92982	.26043	,49916	354
12	,03863	,27001	,03990	,23013	,93273	.26122	,50388	348
18	,03868	,27033	,03999	,23046	,93564	.26201	,50860	342
24	,03872	,27066	,04008	,23078	,93854	.26280	,51332	336
30	,03876	,27099	,04017	,23111	,94145	.26359	,51804	330
36	,03881	,27131	,04026	,23144	,94436	.26438	,52276	324
42	,03885	,27164	,04035	,23176	,94727	.26517	,52748	318
48	,03889	,27196	,04044	,23209	,95018	.26596	,53220	312
54	,03894	,27239	,04052	,23242	,95308	.26679	,53682	306
60	,03898	,27271	,04061	,23274	,95599	.26754	,54164	300
66	,03902	,27304	,04070	,23307	,95889	.26833	,54636	294
72	,03907	,27337	,04079	,23340	,96180	.26912	,55108	288
78	,03911	,27369	,04088	,23372	,96471	.26991	,55581	282
84	,03915	,27401	,04097	,23405	,96762	.27069	,55953	276
90	,03919	,27433	,04106	,23438	,97052	.27148	,56425	270
96	,03924	,27466	,04115	,23470	,97343	.27227	,56897	264
102	,03923	,27498	,04124	,23503	,97634	.27306	,57369	258
108	,03932	,27531	,04132	,23536	,97925	.27385	,57841	252
114	,03937	,27564	,04141	,23568	,98215	.27464	,58313	246
120	,03941	,27596	,04150	,23601	,98506	.27543	,58785	240
126	,03945	,27629	,04159	,23634	,98797	.27622	,59257	234
132	,03950	,27661	,04168	,23666	,99087	.27701	,59729	228
138	,03954	,27694	,04177	,23699	,99378	.27780	,60201	222
144	,03958	,27727	,04186	,23732	,99669	.27859	,60673	216
150	,03963	,27759	,04195	,23764	,99960	.27938	,61145	210
156	,03967	,27792	,04204	,23797	1,00250	.28017	,61617	204
162	,03971	,27824	,04213	,23830	1,00541	.28096	,62089	198
168	,03976	,27857	,04222	,23863	1,00832	.28175	,62461	192
174	,03981	,27889	,04231	,23896	1,01123	.28254	,62933	186
180	,03988	,27916	,04250	,23928	1,01414	.28333	,63611	180
Diff.	4	32	9	33	291	79	472	erēc

The Declination and Meridian Angles.

	♈ ♎		♉ ♍		♊ ♐		
	Declina.	Ang.	Declina.	Ang.	Declina.	Ang.	
	D. parts	D. P.	D. Parts.	D. P.	D. Parts.	D. P.	
0	0,00000	66.47	11,51167	69,33	20,22278	77.70	30
1	0,39889	56.47	11,86333	69,52	20,43917	78.07	29
2	0,79806	56.48	12,21111	69,72	20,63583	78.43	28
3	1,19694	66.50	12,55583	69,92	20,83278	78.80	27
4	1,59528	66.52	12,89694	70,13	21,02361	79.18	26
5	1,99361	66.55	13,23472	70,35	21,20806	79.57	25
6	2,39111	66.58	13,56861	70,58	21,38528	79.95	24
7	2,78778	66.63	13,89917	70,81	21,55611	80.33	23
8	3,18444	66.68	14,22556	71,05	21,72083	80.72	22
9	3,57972	66.73	14,54806	71,30	21,87833	81.12	21
10	3,97444	66.78	14,86639	71,55	22,02917	81.51	20
11	4,36778	66.85	15,18056	71,80	22,17278	81.92	19
12	4,76028	66.92	15,49056	72,07	22,30972	82.31	18
13	5,15139	67.00	15,79639	72,33	22,43944	82.73	17
14	5,54139	67.08	16,09750	72,60	22,56222	83.15	16
15	5,92972	67,18	16,39417	72,88	22,67750	83.57	15
16	6,31611	67.28	16,68861	73,17	22,78611	83.98	14
17	6,70167	67.40	16,97278	73,45	22,88694	84.40	13
18	7,08500	67.52	17,25500	73,75	22,98083	84.83	12
19	7,46667	67.63	17,53167	74,05	23,06750	85.25	11
20	7,84611	67.75	17,80389	74,35	23,14639	85.68	10
21	8,22389	67.88	18,07056	74,67	23,21806	86.10	09
22	8,59944	68.02	18,33250	74,98	23,28222	86.53	08
23	8,97222	68.15	18,58833	75,30	23,33889	86.97	07
24	9,34278	68.30	18,83917	75,63	23,38833	87.40	06
25	9,71139	68.47	19,08444	75,97	23,43000	87.83	05
26	10,07722	68.63	19,32389	76,30	23,46417	88.26	04
27	10,44000	68.80	19,55750	76,65	23,49083	88.70	03
28	10,80056	68.97	19,78528	77,00	23,50972	89.13	02
29	11,15750	69.15	20,00722	77,35	23,52139	89.57	01
30	11,51167	69.33	20,22278	77.70	23,52500	90.00	00
	♑ ♓		♋ ♌		♒ ♏		

Tycho's Table of Refractions.

Altitude	☉	☽	✶ ✶
	Parts.	Parts.	Parts.
0	,56667	,55000	,50000
1	,43333	,41667	,35833
2	,33333	,33333	,25833
3	,28333	,28333	,20833
4	,25833	,25556	,18333
5	,24167	,23889	,16667
6	,22500	,23056	,15000
7	,21250	,21250	,13750
8	,18750	,20000	,11250
9	,17500	,18889	,10000
10	,16667	,17917	,09167
11	,15833	,16944	,08333
12	,15000	,15972	,07500
13	,14167	,15000	,06667
14	,13333	,14167	,05833
15	,12500	,13333	,05000
16	,11667	,12500	,04167
17	,10833	,11667	,03333
18	,09583	,10833	,02083
19	,08333	,10000	,00833
20	,07500	,09167	,00000
21	,06667	,08333	,00000
22	,05833	,07639	,00000

Altitude	☉	☽
	Parts.	Parts.
23	,05278	,06944
24	,04722	,06250
25	,04167	,05556
26	,03750	,05000
27	,03333	,04444
28	,02917	,03889
29	,02639	,03333
30	,02361	,02778
31	,02083	,02500
32	,01806	,02222
33	,01528	,01944
34	,01250	,01667
35	,00972	,01389
36	,00833	,01250
37	,00694	,01111
38	,00556	,00972
39	,00417	,00833
40	,00278	,00694
41	,00250	,00556
42	,00222	,00417
43	,00194	,00278
44	,00167	,00139
45	,00139	,00000

Saturns Mean Motions.

Epochæ		Longit. ♄ Deg. parts	Aphelió. ♄ Deg. parts	Node ♄ Deg. Parts.
Christi.		73.13056	215.25722	98. 98861
1600		208.43944	265.99722	110. 51389
1620		93.13083	266.63139	110. 65778
1640		337.81722	267.26583	110. 80194
1660		222.50111	267.88333	110. 94583
	1	12.22611	0.03167	0. 00722
	2	24.45250	0.06333	0. 01444
	3	36.67861	0.09500	0. 02167
B	4	48.93833	0.12694	0. 02889
	5	61.16444	0.15861	0. 03611
	6	73.39056	0.19078	0. 04306
	7	85.61694	0.22194	0. 05028
B	8	97.87667	0.25361	0. 05750
	9	110.10278	0.28528	0. 06472
	10	122.32889	0.31694	0. 07194
	11	134.55500	0.34889	0. 07917
B	12	146.81472	0.38056	0. 08639
	13	159.04111	0.41222	0. 09361
	14	171.26722	0.44389	0. 10083
	15	183.49333	0.47556	0. 10806
B	16	195.75306	0.50722	0. 11528
	17	207.97917	0.53917	0. 12250
	18	220.20556	0.57083	0. 12944
	19	232.43167	0.60250	0. 13667
B	20	244.69139	0.63417	0. 14389
	40	129.38278	1 26861	0. 28806
	60	14.07417	1.90278	0. 43222
	80	258.76528	2.53694	0. 57611
	100	143.45667	3.17111	0. 72028

Saturns mean Motions.

Years.	Longit. ♄ Deg. parts.	Aphel. ♄ Deg. parts.	Node ♄ Deg. parts.
100	143,45667	3,27111	0,72028
200	286,91361	6,34250	1,44056
300	80,37056	9,51361	2,16111
400	213,82722	12,68500	2,88139
500	357,28417	15,85611	3,60 67
600	140,74083	19,02750	4,32194
700	284,19778	22,19861	5,04222
800	67,65444	25,37001	5,76278
900	211,11139	28,5411	6,48306
1000	354,56086	31,71250	7,20333
2000	349,13639	63,42500	14,40667
3000	343,70444	95,13750	21,61000
4000	338,27278	126,85000	28,81333
5000	332,84083	158,56250	36,01667

Ianuary	1,03833	0,00278	0,00056
February	1,97639	0,00528	0 00139
March	3,01472	0,00778	0,00194
April	4'01944	0,01028	0,00250
May	5,05806	0,01333	0,00333
Iune	6,06278	0,01556	0,00389
Iuly	7,10111	0,01833	0,00444
Auguſt	8,13972	0,02139	0,00500
September	9,14444	0,02361	0,00556
October	10,18278	0,02639	0,00611
November	11,18778	0,02917	0,00667
December	12,22611	0,03167	0,00722

Saturns Mean Motions.

In Daies.				In Hours.	
	Long. ♄	Aphel. ♄	Nod. ♄		Long. ♄
	D. parts	Parts.	Parts.		Parts.
1	0,03361	,00000	,00002	1	,00139
2	0,06694	,00000	,00003	2	,00278
3	0,10056	,00028	,00005	3	,00417
4	0,13389	,00028	,00007	4	,00556
5	0,16750	,00056	,00009	5	,00694
6	0,20111	,00056	,00011	6	,00833
7	0,23444	,00056	,00013	7	,00972
8	0,26806	,00083	,00015	8	,01111
9	0,30139	,00083	,00017	9	,01250
10	0,33500	,00083	,00019	10	,01389
11	0,36861	,00111	,00020	11	,01528
12	0,40194	,00111	,00022	12	,01667
13	0,43556	,00111	,00024	13	,01806
14	0,46889	,00139	,00026	14	,01944
15	0,50250	,00139	,00028	15	,02083
16	0,53583	,00139	,00030	16	,02222
17	0,56944	,00167	,00032	17	,02361
18	0,60306	,00167	,00034	18	,02500
19	0,63639	,00167	,00036	19	,02639
20	0,67000	,00194	,00038	20	,02778
21	0,70333	,00194	,00040	21	,02917
22	0,73694	,00194	,00042	22	,03083
23	0,77056	,00222	,00043	23	,03222
24	0,80389	,00222	,00043	24	,03361
25	0,83750	,00222	,00045		
26	0,87083	,00250	,00047		
27	0,90444	,00250	,00049		
28	0,93806	,00250	,00051		
29	0,97139	,00278	,00053		
30	1,00500	,00278	,00055		
31	1,03833	,00278	,00057		
32	1,07194	,00306	,00059		

Saturn's mean Motions in the parts of an Hour.

	Long. ☿ Parts.		Long. ☿ Parts.		Long. ☿ Parts.
1	,00001	34	,00047	67	,00093
2	,00002	35	,00048	68	,00094
3	,00004	36	,00050	69	,00095
4	,00005	37	,00051	70	,00097
5	,00006	38	,00052	71	,00098
6	,00008	39	,00054	72	,00099
7	,00009	40	,00055	73	,00101
8	,00011	41	,00056	74	,00102
9	,00012	42	,00058	75	,00103
10	,00013	43	,00059	76	,00105
11	,00015	44	,00061	77	,00106
12	,00016	45	,00062	78	,00107
13	,00018	46	,00063	79	,00109
14	,00019	47	,00065	80	,00111
15	,00020	48	,00066	81	,00112
16	,00022	49	,00068	82	,00113
17	,00023	50	,00069	83	,00115
18	,00025	51	,00070	84	,00116
19	,00026	52	,00072	85	,00118
20	,00027	53	,00074	86	,00119
21	,00029	54	,00075	87	,00120
22	,00030	55	,00076	88	,00122
23	,00032	56	,00078	89	,00123
24	,00033	57	,00079	90	,00125
25	,00035	58	,00081	91	,00126
26	,00036	59	,00082	92	,00127
27	,00037	60	,00083	93	,00129
28	,00039	61	,00085	94	,00130
29	,00040	62	,00086	95	,00131
30	,00042	63	,00087	96	,00133
31	,00043	64	,00089	97	,00134
32	,00044	65	,00090	98	,00136
33	,00046	66	,00091	99	,00137

Jupiter's mean Motions.

Epochæ	Longit. ♃ Deg. parts.	Aphel. ♃ Deg. Parts.	Node ♃ Deg. Parts.
Christi.	179,91583	148,42389	87,67722
1600	160,80556	188,02333	98,62306
1620	48,06667	188,51833	98,76000
1640	295,32778	189,01333	98,89667
1660	182,58889	189,50833	99,03333
1	30,34222	0,02472	0,00694
2	60,68444	0,04944	0,01361
3	91,02667	0,07417	0,02056
B 4	121,45222	0,09889	0,02722
5	151,79444	0,12361	0,03417
6	182,13667	0,14833	0,04111
7	212,47889	0,17333	0,04778
B 8	242,90444	0,19806	0,05472
9	273,24667	0,22278	0,06167
10	303,58889	0,24750	0,06833
11	333,93139	0,27222	0,07528
B 12	4,35667	0,29694	0,08194
13	34,69889	0,32167	0,08889
14	65,04111	0,34639	0,09583
15	95,38361	0,37111	0,10250
B 16	125,80889	0,39611	0,10944
17	156,15111	0,42083	0,11639
18	186,49361	0,44556	0,12306
19	216,83583	0,47028	0,13000
B 20	247,26111	0,49500	0,13694
40	134,52222	0,99000	0,27361
60	21,78333	1,48500	0,41056
80	269,04444	1,98000	0,54722
100	156,30556	2,47500	0,68417

Jupiters mean Motions.

Years.	Longit. ♃ Deg.parts.	Aphelion. ♃ Deg. Parts.	Node. ♃ Deg.Parts.
100	156,30556	2,47500	0,68417
200	312,61111	4,95000	1,36833
300	108,91694	7,42500	2,05222
400	265,22250	9,89972	2,73639
500	61,52806	12,37472	3,42056
600	217,83361	14,84972	4,10472
700	14,13944	17,32472	4,78861
800	170,44500	19,79972	5,47278
900	326,75056	22,27472	6,15694
1000	123,05611	24,74972	6,84111
2000	246,11250	49,49972	13,68222
3000	9,16861	74,24889	20,52306
4000	132,22500	98,99833	27,36417
5000	255,28111	123,74806	34,20500

January.	2.57694	0,00194	0,00056
February.	4.90472	0,00417	0,00111
March.	7.48167	0,00611	0,00167
April.	9.97556	0,00806	0,00222
May.	12.55250	0,01028	0,00278
June.	15.04639	0,01222	0,00333
July.	17.62333	0,01444	0,00389
August.	20.20056	0,01667	0,00444
Septemb.	22.69444	0,01861	0,00500
October.	25.27139	0,02083	0,00556
Novemb.	27.76528	0,02278	0,00611
Decemb.	30.34222	0,02472	0,00694

Jupiter's mean Motions.

In Dayes.

	Long. ☿	Aphel. ☿	Nod. ☿
	D. parts	Parts.	Parts.
1	0,08306	,00006	,00002
2	0,16611	,00013	,00003
3	0,24944	,00020	,00005
4	0,33250	,00026	,00007
5	0,41556	,00033	,00009
6	0,49861	,00039	,00011
7	0,58194	,00046	,00013
8	0,66500	,00053	,00015
9	0,74816	,00059	,00017
10	0,83141	,00066	,00019
11	0,91444	,00072	,00020
12	0,99750	,00079	,00022
13	1,08056	,00085	,00024
14	1,16361	,00091	,00026
15	1,24694	,00098	,00028
16	1,33000	,00104	,00030
17	1,41306	,00111	,00032
18	1,49611	,00117	,00034
19	1,57944	,00123	,00036
20	1,66250	,00130	,00038
21	1,74556	,00136	,00039
22	1,82861	,00142	,00041
23	1,91194	,00149	,00043
24	1,99500	,00155	,00045
25	2,07805	,00162	,00047
26	2,16111	,00168	,00049
27	2,24444	,00174	,00051
28	2,32750	,00181	,00053
29	2,41056	,00187	,00055
30	2,49389	,00203	,00057
31	2,57694	,00109	,00059
32	2,66000	,00216	,00061

In Hours.

	Long. ☿
	Parts.
1	,00333
2	,00722
3	,01028
4	,01389
5	,01722
6	,02083
7	,02417
8	,02722
9	,03111
10	,03472
11	,03806
12	,04167
13	,04500
14	,04861
15	,05194
16	,05556
17	,05889
18	,06222
19	,06583
20	,06917
21	,07278
22	,07611
23	,07972
24	,08306

Jupiters mean Motions in the parts of an Hour.

	Long. ♃ Parts.		Long. ♃ Parts.		Long. ♃ Parts.
1	, 00003	34	, 00117	67	, 00232
2	, 00007	35	, 00121	68	, 00235
3	, 00010	36	, 00124	69	, 00238
4	, 00013	37	, 00128	70	, 00241
5	, 00017	38	, 00131	71	, 00245
6	, 00020	39	, 00135	72	, 00248
7	, 00024	40	, 00138	73	, 00251
8	, 00027	41	, 00142	74	, 00255
9	, 00031	42	, 00145	75	, 00258
10	, 00034	43	, 00149	76	, 00262
11	, 00038	44	, 00152	77	, 00265
12	, 00041	45	, 00156	78	, 00269
13	, 00045	46	, 00159	79	, 00272
14	, 00048	47	, 00162	80	, 00276
15	, 00052	48	, 00166	81	, 00279
16	, 00055	49	, 00169	82	, 00283
17	, 00058	50	, 00173	83	, 00286
18	, 00062	51	, 00176	84	, 00290
19	, 00065	52	, 00180	85	, 00293
20	, 00069	53	, 00183	86	, 00297
21	, 00072	54	, 00187	87	, 00300
22	, 00076	55	, 00190	88	, 00303
23	, 00079	56	, 00194	89	, 00307
24	, 00083	57	, 00197	90	, 00311
25	, 00086	58	, 00201	91	, 00314
26	, 00090	59	, 00204	92	, 00318
27	, 00093	60	, 00208	93	, 00321
28	, 00097	61	, 00211	94	, 00325
29	, 00100	62	, 00214	95	, 00328
30	, 00104	63	, 00218	56	, 00332
31	, 00107	64	, 00221	97	, 00335
32	, 00111	65	, 00225	98	, 00339
33	, 00114	66	, 00228	99	, 00342

The Mean Motions of *Mars*.

	Epochæ	Longit. ♂ Dég. parts	Aphelió ♂ Deg. parts	Node ♂ Deg. Parts.
	Christi.	40.71611	113.97083	25. 30583
	1600	307.27611	148.99833	46. 74222
	1620	175.60778	149.43611	47. 01028
	1640	43.94000	149.87389	47. 27806
	1660	272.27194	150.21167	47. 54639
	1	191.28556	0.02194	0. 01333
	2	22.57111	0.04389	0. 02667
	3	213.85667	0.06556	0. 04028
B	4	45.66639	0.08750	0. 05361
	5	236.95167	0.10944	0. 06694
	6	68.23750	0.13139	0. 08028
	7	259.52278	0.15306	0. 09361
B	8	91.33278	0.17500	0. 10722
	9	282.61833	0.19722	0. 12056
	10	113.90389	0.21889	0. 13389
	11	305.18944	0.24056	0. 14722
B	12	136.99917	0.26250	0. 16056
	13	328.28472	0.28444	0. 17417
	14	159.57028	0.30639	0. 18778
	15	350.85583	0.32806	0. 20111
B	16	182.66556	0.35028	0. 21444
	17	13.95111	0.37222	0. 22778
	18	205.23667	0.39417	0. 24139
	19	36.52222	0.41583	0. 25472
B	20	228.33194	0.43778	0. 26806
	40	96.66389	0.47556	0. 53583
	60	324.99611	1.31333	0. 80389
	80	193.32778	1.75139	1. 07194
	100	61.66000	2.18917	1. 33972

The mean Motions of *Mars*.

Years.	Longit. ♂ Deg. parts.	Aphel. ♂ Deg. parts.	Node ♂ Deg. parts.
100	61,66000	2,18917	1,17306
200	123,32000	4,37833	2,67944
300	184,98000	6,56778	4,01944
400	246,64000	8,75694	5,35917
500	308,30000	10,94611	6,69889
600	9,96000	13,13528	8,03861
700	71,62000	15,32444	9,37833
800	133,28000	17,51361	10,71806
900	194,94000	19,70306	12,05806
1000	256,60000	21,89222	13,39778
2000	153,20028	43,78444	26,79528
3000	49,80028	65,67639	40,19306
4000	306,40056	8-,56889	53,59056
5000	203,00056	109,46083	66,98833

January	16,24611	0,00194	0,00111
February	30,92028	0,00361	0,00222
March	47,16639	0,00556	0,00333
April	62,88833	0,00722	0,00444
May	79,13472	0,00917	0,00556
June	94,85667	0,01083	0,00667
July	111,10306	0,01250	0,00778
August	127,34917	0,01444	0,00889
September	143,07111	0,01639	0,01000
October	159,31750	0,01833	0,01111
November	175,03944	0,02028	0,01222
December	191,28556	0,02194	0,01333

The mean Motions of *Mars*.

In Dayes.

	Long. ♂ D. Parts.	Aphe. ♂ Parts.	Node ♂ Parts.
1	0,52417	,00006	,00003
2	1,04806	,00012	,00007
3	1,57222	,00018	,00010
4	2,09611	,00024	,00014
5	2,62111	,00030	,00018
6	3,14444	,00036	,00021
7	3,66833	,00042	,00025
8	4,19250	,00048	,00028
9	4,71667	,00054	,00032
10	5,24083	,00060	,00036
11	5,76472	,00066	,00039
12	6,28889	,00072	,00043
13	6,81278	,00078	,00046
14	7,33694	,00084	,00050
15	7,86111	,00090	,00054
16	8,38500	,00096	,00057
17	8,90917	,00102	,00061
18	9,43333	,00108	,00064
19	9,95750	,00114	,00068
20	10,48139	,00120	,00072
21	11,00556	,00126	,00075
22	11,52944	,00132	,00079
23	12,05361	,00138	,00082
24	12,57778	,00144	,00086
25	13,10167	,00150	,00090
26	13,62583	,00156	,00093
27	14,15000	,00162	,00097
28	14,67417	,00168	,00100
29	15,19861	,00174	,00104
30	15,72222	,00180	,00108
31	16,24611	,00186	,00111
32	16,77028	,00192	,00115

In Hours.

	Long. ♂ Parts.
1	,02194
2	,04361
3	,06556
4	,08722
5	,10917
6	,13111
7	,15278
8	,17472
9	,19667
10	,21833
11	,24028
12	,26194
13	,28389
14	,30583
15	,32750
16	,34944
17	,37111
18	,39306
19	,41500
20	,43667
21	,45861
22	,48028
23	,50222
24	,52417

The mean Motions of *Mars* in parts of an Hour.

	Long. ♂ Parts.		Long. ♂ Parts.		Long. ♂ Parts.
1	, 00022	34	, 00742	67	, 01461
2	, 00043	35	, 00764	68	, 01483
3	, 00065	36	, 00785	69	, 01505
4	, 00087	37	, 00807	70	, 01527
5	, 00109	38	, 00829	71	, 01548
6	, 00131	39	, 00851	72	, 01570
7	, 00152	40	, 00873	73	, 01592
8	, 00174	41	, 00894	74	, 01614
9	, 00196	42	, 00916	75	, 01636
10	, 00218	43	, 00938	76	, 01657
11	, 00240	44	, 00960	77	, 01679
12	, 00262	45	, 00982	78	, 01701
13	, 00284	46	, 01003	79	, 01723
14	, 00306	47	, 01025	80	, 01746
15	, 00327	48	, 01047	81	, 01768
16	, 00349	49	, 01069	82	, 01789
17	, 00371	50	, 01091	83	, 01811
18	, 00393	51	, 01112	84	, 01833
19	, 00415	52	, 01134	85	, 01855
20	, 00436	53	, 01156	86	, 01877
21	, 00458	54	, 01178	87	, 01898
22	, 00480	55	, 01200	88	, 01920
23	, 00502	56	, 01221	89	, 01942
24	, 00524	57	, 01243	90	, 01966
25	, 00545	58	, 01265	91	, 01988
26	, 00567	59	, 01287	92	, 02009
27	, 00589	60	, 01309	93	, 02031
28	, 00611	61	, 01330	94	, 02053
29	, 00633	62	, 01352	95	, 02075
30	, 00655	63	, 01374	56	, 02097
31	, 00676	64	, 01396	97	, 02118
32	, 00698	65	, 01418	98	, 02140
33	, 00720	66	, 01439	99	, 02162

The mean Motions of *Venus*.

Epochæ	Longit. ♀ Deg. parts.	Aphel. ♀ Deg. Parts.	Node ♀ Deg. Parts.
Christi.	42,77917	282,84556	60,72111
1600	352,47278	305,38500	74,12722
1620	176,34389	305,66667	74,29472
1640	0,21500	305,94833	74,46222
1660	184,08611	306,23000	74,62972
1	224,79306	0,01417	0.00833
2	89,58611	0,02806	0,01667
3	324,37917	0,04222	0,02500
B 4	180,77417	0,05639	0,03361
5	45,56722	0,07028	0,04194
6	270,36028	0,08444	0,05028
7	135,15333	0,09861	0,05861
B 8	1,54833	0,11250	0,06694
9	226,34139	0,12667	0,07528
10	91,13444	0,14083	0,08361
11	315,92750	0,15472	0,09222
B 12	182,32278	0,16889	0,10056
13	47,11583	0,18306	0,10889
14	271,90861	0,19722	0,11722
15	136,70167	0,21111	0,12556
B 16	3,09694	0,22528	0 13389
17	227,89000	0,23944	0,14222
18	92,68306	0,25333	0,15083
19	317,47611	0,26750	0,15917
B 20	183,87111	0,28167	0,16750
40	7,74222	0,56361	0,33528
60	191,61361	0,84528	8,50278
80	15,48472	1,12694	0,67028
100	199,35583	1,40861	0,83778

The mean Motions of *Venus*.

Years.	Longit. ♀ Deg.parts.	Aphelion. ♀ Deg. Parts.	Node. ♀ Deg. Parts.
100	199,35583	1,40861	0,83778
200	38,71167	2,81750	1,67583
300	238,06750	4,22611	2,51361
400	77,42333	5,63500	2,35167
500	276,77917	7,04361	4,18944
600	116,13500	8,45222	5,02750
700	315,49083	9,86111	5,86528
800	154,84639	11,26972	6,70333
900	354,20250	12,67833	7,54111
1000	193,55833	14,08722	8,37889
2000	27,11639	28,17444	16,75778
3000	220,67472	42,86139	28,13694
4000	54,23278	46,34889	33,51611
5000	247,79111	61,43583	41,89500

January.	49.66750	0,00111	0,00083
February.	94.52833	0,00222	0,00139
March.	144.19556	0,00361	0,00222
April.	192.26083	0,00472	0,00278
May.	241.92833	0,00583	0,00361
June.	289.99361	0,00694	0,00417
July.	339.65833	0,00806	0,00500
August.	29.32833	0,00917	0,00556
Septemb.	77.39361	0,01056	0,00611
October.	127.06083	0,01167	0,00694
Novemb.	171.12611	0,01278	0,00750
Decemb.	224.79306	0,01417	0,00833

The mean Motions of *Venus*.

In Dayes.			
	Long. ♀	Aphel. ♀	Node ♀
	D. Parts.	Parts.	Parts.
1	1, 60222	00004	00002
2	3, 20444	00007	00004
3	4, 80639	00011	00006
4	6, 40861	00015	00009
5	8, 01083	00019	00011
6	9, 61306	00023	00013
7	10, 21528	00027	00016
8	12, 81750	00031	00018
9	14, 41944	00035	00020
10	16, 02167	00038	00023
11	17, 62389	00042	00025
12	19, 22611	00046	00027
13	20, 82833	00050	00030
14	22, 43056	00054	00032
15	24, 03250	00058	00034
16	25, 63472	00062	00037
17	27, 23694	00066	00039
18	28, 83917	00069	00041
19	30, 44139	00073	00044
20	32, 04361	00077	00046
21	33, 64556	00081	00048
22	35, 24778	00085	00051
23	36, 85000	00089	00053
24	38, 45222	00093	00055
25	40, 05444	00097	00058
26	41, 65639	00100	00060
27	43, 25861	00104	00062
28	44, 86083	00108	00065
29	46, 46306	00112	00067
30	48, 06528	00116	00069
31	49, 66750	00120	00072
32	51, 26972	00124	00074

In Hours.	
	Long. ♀
	Parts.
1	0,06667
2	0,13361
3	0,20028
4	0,26722
5	0,33389
6	0,40056
7	0,46750
8	0,53417
9	0,60083
10	0,66778
11	0,73444
12	0,80139
13	0,86806
14	0,93472
15	1,00167
16	1,06833
17	1,13500
18	1,20194
19	1,26861
20	1,33556
21	1,40222
22	1,46889
23	1,53583
24	1,60250

The mean Motions of *Venus* in parts of an Hour.

	Long. ♀ Parts.		Long. ♀ Parts.		Long. ♀ Parts.
1	,00067	34	,02270	67	,04474
2	,00133	35	,02337	68	,04541
3	,00200	36	,02404	69	,04608
4	,00267	37	,02470	70	,04674
5	,00334	38	,02537	71	,04741
6	,00401	39	,02604	72	,04808
7	,00468	40	,02671	73	,04874
8	,00534	41	,02738	74	,04941
9	,00601	42	,02805	75	,05008
10	,00667	43	,02871	76	,05075
11	,00734	44	,02938	77	,05142
12	,00801	45	,03005	78	,05209
13	,00868	46	,03071	79	,05276
14	,00935	47	,03138	80	,05342
15	,01002	48	,03205	81	,05408
16	,01068	49	,03272	82	,05475
17	,01135	50	,03339	83	,05542
18	,01202	51	,03406	84	,05609
19	,01268	52	,03472	85	,05676
20	,01335	53	,03539	86	,05743
21	,01402	54	,03606	87	,05810
22	,01469	55	,03672	88	,05876
23	,01536	56	,03739	89	,05943
24	,01603	57	,03806	90	,06009
25	,01669	58	,03873	91	,06076
26	,01736	59	,03940	92	,06143
27	,01803	60	,04007	93	,06210
28	,01869	61	,04073	94	,06277
29	,01936	62	,04140	95	,06344
30	,02003	63	,04207	96	,06410
31	,02070	64	,04273	97	,06477
32	,02137	65	,04340	98	,06544
33	,02204	66	,04407	99	,06610

Mercuries mean Motion.

Epochæ		Longit. ☿	Aphelió. ☿	Node ☿
		Deg. parts	Deg. parts	Deg. Parts.
Christi.		316.26111	205.31361	000. 03000
1600		66.95583	251.63028	42. 51139
1620		81.83944	252.20611	43. 04250
1640		96.72306	252.78806	43. 57361
1660		111.65694	253.35028	44. 10472
	1	53.72111	0.02889	0. 02667
	2	107.44222	0.05778	0. 05306
	3	161.16333	0.08667	0. 07972
B	4	218.97667	0.11583	0. 10611
	5	272.69778	0.14472	0. 13278
	6	326.41889	0.17361	0. 15917
	7	20.14000	0.20250	0. 18583
B	8	77.95361	0.23167	0. 21250
	9	131.67444	0.26056	0. 23889
	10	185.39556	0.28944	0. 26556
	11	239.11667	0.31833	0. 29194
B	12	296.92694	0.34750	0. 31861
	13	350.65139	0.37639	0. 34528
	14	44.37250	0.40527	0. 37167
	15	98.09361	0.43417	0. 39833
B	16	155.90694	0.46333	0. 42472
	17	209.62806	0.49222	0. 45139
	18	263.34917	0.52111	0. 47778
	19	317.07028	0.55000	0. 50444
B	20	14.88361	0.57889	0. 53111
	40	29.76722	1.15778	1. 06194
	60	44.65083	1.73667	1. 59306
	80	59.53472	2.31611	2. 12417
	100	74.41833	2.89472	2. 65500

Mercuries mean Motions

Years.	Longit. ☿ Deg. parts.	Aphel. ☿ Deg. parts.	Node ☿ Deg. parts.
100	74,41833	2,89472	2,65500
200	148,83694	5,78972	5,31028
300	223,25527	8,68444	7,96528
400	297,67361	11,57917	10,62028
500	12,09222	14,47389	13,27556
600	86,51056	17,36889	15,93056
700	160,92889	20,26361	18,58556
800	235,34750	23,15833	21,24083
900	309,78250	26,05333	23,89583
1000	24,18417	28,94806	26,55083
2000	48,36861	57,89611	43,10194
3000	72,55278	86,84417	79,65278
4000	96,73694	115,79222	106,20333
5000	120,92472	144,74861	132,75472

January	126,86389	0,00250	0,00222
February	241,45083	0,00472	0,00444
March	8,31472	0,00722	0,00667
April	131,08639	0,00972	0,00861
May	257,95028	0,01222	0,01083
June	20,72194	0,01444	0,01306
July	147,58583	0,01694	0,01528
August	274,44972	0,01917	0,01778
September	37,22139	0,02167	0,02000
October	164,08556	0,02417	0,02222
November	286,85722	0,02639	0,02417
December	53,72139	0,02889	0,02667

The Mean Motions of *Mars*.

	In Dayes.			In Hours.
	Long. ♂	Aphel. ♂	Node. ♂	Long. ♂
	Deg. parts.	Parts.	Parts.	Parts.
1	4,09222	,00008	,00007	0,17056
2	8,18472	,00015	,00014	0,34111
3	12,27722	,00023	,00021	0,51167
4	16,36944	,00031	,00029	0,68222
5	20,46194	,00039	,00036	0,85250
6	24,55444	,00047	,00043	1,02306
7	28,64667	,00055	,00051	1,19361
8	32,73917	,00063	,00058	1,36417
9	36,83139	,00071	,00065	1,53472
10	40,92389	,00079	,00073	1,70528
11	45,01611	,00086	,00080	1,87556
12	49,10861	,00094	,00087	2,04611
13	53,20111	,00102	,00095	2,21667
14	57,29333	,00110	,00102	2,37822
15	61,38583	,00118	,00109	2,55778
16	65,47806	,00126	,00117	2,72806
17	69,57056	,00134	,00124	2,89861
18	73,66306	,00142	,00131	3 06917
19	77,75528	,00150	,00139	3,23972
20	81,84778	,00158	,00146	3,41028
21	85,94000	,00165	,00153	3,58083
22	90,03250	,00173	,00161	3,75111
23	94,12500	,00181	,00168	3,92167
24	98,21722	,00189	,00175	4,09222
25	102,30972	,00197	,00182	
26	106,40194	,00205	,00190	
27	110,49444	,00213	,00197	
28	114,58694	,00221	,00204	
29	118,67917	,00229	,00212	
30	122,77167	,00237	,00219	
31	126,86389	,00243	,00226	
32	130,95611	,00251	,00233	

Mercuries mean Motions in parts of an Hour.

—	Long. ☿ Parts.
1	, 00170
2	, 00341
3	, 00511
4	, 00682
5	, 00852
6	, 01023
7	, 01193
8	, 01364
9	, 01534
10	, 01705
11	, 01875
12	, 02046
13	, 02217
14	, 02387
15	, 02557
16	, 02728
17	, 02898
18	, 03069
19	, 03239
20	, 03410
21	, 03580
22	, 03751
23	, 03921
24	, 04092
25	, 04262
26	, 04433
27	, 04603
28	, 04774
29	, 04944
30	, 05115
31	, 05285
32	, 05456
33	, 05626
34	, 05797
35	, 05967
36	, 06138
37	, 06308
38	, 06479
39	, 06649
40	, 06820
41	, 06990
42	, 07161
43	, 07331
44	, 07502
45	, 07672
46	, 07843
47	, 08013
48	, 08184
49	, 08354
50	, 08525
51	, 08695
52	, 08866
53	, 09036
54	, 09207
55	, 09377
56	, 09548
57	, 09718
58	, 09889
59	, 10059
60	, 10230
61	, 10400
62	, 10571
63	, 10741
64	, 10912
65	, 11082
66	, 11253
67	, 11423
68	, 11594
69	, 11764
70	, 11935
71	, 12106
72	, 12276
73	, 12446
74	, 12617
75	, 12787
76	, 12958
77	, 13128
78	, 13299
79	, 13469
80	, 13640
81	, 13811
82	, 13981
83	, 14152
84	, 14322
85	, 14493
86	, 14663
87	, 14834
88	, 15004
89	, 15175
90	, 15345
91	, 15516
92	, 15687
93	, 15857
94	, 16028
95	, 16198
96	, 16369
97	, 16540
98	, 16711
99	, 16882

The Mean Motions of *Mars*.

In Dayes.				In Hours.
	Long. ♂	Aphel. ♂	Node. ♂	Long. ♂
	Deg. parts.	Parts.	Parts.	Parts.
1	4,09222	,00008	,00007	0,17056
2	8,18472	,00015	,00014	0,34111
3	12,27722	,00023	,00021	0,51167
4	16,36944	,00031	,00029	0,68222
5	20,46194	,00039	,00036	0,85250
6	24,55444	,00047	,00043	1,02306
7	28,64667	,00055	,00051	1,19361
8	32,73917	,00063	,00058	1,36417
9	36,83193	,00071	,00065	1,53472
10	40,92389	,00079	,00073	1,70528
11	45,01611	,00086	,00080	1,87556
12	49,10861	,00094	,00087	2,04611
13	53,20111	,00102	,00095	2,21667
14	57,29333	,00110	,00102	2,38722
15	61,38583	,00118	,00109	2,55778
16	65,47806	,00126	,00117	2,72806
17	69,57056	,00134	,00124	2,89861
18	73,66306	,00142	,00131	3 06917
19	77,75528	,00150	,00139	3,23972
20	81,84778	,00158	,00146	3,41028
21	85,94006	,00165	,00153	3,58083
22	90,03250	,00173	,00161	3,75111
23	94,12500	,00181	,00168	3,92167
24	98,21722	,00189	,00175	4,09222
25	102,30972	,00197	,00182	
26	106,40194	,00205	,00190	
27	110,49444	,00213	,00197	
28	114,58694	,00221	,00204	
29	118,67917	,00229	,00212	
30	122,77167	,00237	,00219	
31	126,86389	,00243	,00226	
32	130,95611	,00251	,00233	

Mercuries mean Motions in parts of an Hour.

	Long. ☿ Parts.		Long. ☿ Parts.		Long. ☿ Parts.
1	, 00170	34	, 05797	67	, 11423
2	, 00341	35	, 05967	68	, 11594
3	, 00511	36	, 06138	69	, 11764
4	, 00682	37	, 06308	70	, 11935
5	, 00852	38	, 06479	71	, 12106
6	, 01023	39	, 06649	72	, 12276
7	, 01193	40	, 06820	73	, 12446
8	, 01364	41	, 06990	74	, 12617
9	, 01534	42	, 07161	75	, 12787
10	, 01705	43	, 07331	76	, 12958
11	, 01875	44	, 07502	77	, 13128
12	, 02046	45	, 07672	78	, 13299
13	, 02217	46	, 07843	79	, 13469
14	, 02387	47	, 08013	80	, 13640
15	, 02557	48	, 08184	81	, 13811
16	, 02728	49	, 08354	82	, 13981
17	, 02898	50	, 08525	83	, 14152
18	, 03069	51	, 08695	84	, 14322
19	, 03239	52	, 08866	85	, 14493
20	, 03410	53	, 09036	86	, 14663
21	, 03580	54	, 09207	87	, 14834
22	, 03751	55	, 09377	88	, 15004
23	, 03921	56	, 09548	89	, 15175
24	, 04092	57	, 09718	90	, 15345
25	, 04262	58	, 09889	91	, 15516
26	, 04433	59	, 10059	92	, 15687
27	, 04603	60	, 10230	93	, 15857
28	, 04774	61	, 10400	94	, 16028
29	, 04944	62	, 10571	95	, 16198
30	, 05115	63	, 10741	96	, 16369
31	, 05285	64	, 10912	97	, 16540
32	, 05456	65	, 11082	98	, 16711
33	, 05626	66	, 11253	99	, 16882

A Table of Declinations.

	♈ North Latitude.				♎ South Latitude.			
	0	1	2	3	4	5	6	
0	0,00	0,92	1,83	2,75	3,67	4.58	6.00	30
1	0,40	1,32	2,23	3,15	4,07	4.98	6.20	29
2	0,80	1,72	2,63	3,55	4,47	5.38	6.30	28
3	1,20	2,12	3,03	3,95	4,87	5.78	6.70	27
4	1,60	2,51	3,43	4,35	5,27	6.18	7.10	26
5	2,00	2,91	3,83	4,75	5,83	6.58	7.50	25
6	2,40	3,31	4,23	5,15	6,06	6.98	7.88	24
7	2,78	3,71	4,63	5,55	6,46	7.38	8.28	23
8	3,18	4,11	5,03	5,95	6,86	7.78	8.68	22
9	3,58	4,50	5,42	6,33	7,25	8.17	9.08	21
10	3,97	4,90	5,80	6,73	7,65	8.57	9.48	20
11	4,37	5,30	6,20	7,13	8,05	8.97	9.88	19
12	4,77	5,70	6,60	7,53	8,45	9.36	10.27	18
13	5,15	6,08	7,00	7,92	8,83	9.76	10.67	17
14	5,55	6,48	7,40	8,32	9,23	10.16	11.07	16
15	5,93	6,87	7,78	8,70	9,62	10.55	11.45	15
16	6,32	7,23	8,15	9,08	10, 00	10.93	11.85	14
17	6,70	7,62	8,53	9,47	10,38	11.32	12.23	13
18	7,08	8,00	8,93	9,85	10,68	11.70	12.62	12
19	7,47	8,38	9,30	10,23	11,15	12.08	13.00	11
20	7,85	8,77	9,70	10,63	11,55	12.47	13.38	10
21	8,22	9,08	10,15	11,01	11,93	12.85	13.80	9
22	8,60	9,53	10,47	11,38	12,32	13.23	14.15	8
23	8,97	9,92	10,85	11,77	12,70	13.62	14.53	7
24	9,35	10,28	11,22	12,13	13,07	14.00	14.90	6
25	9,72	10,65	11,58	12,50	13,43	14.37	15.28	5
26	10,08	11,02	11,95	12,87	13,80	14.73	15.65	4
27	10,43	11,38	12,32	13,23	14,17	15.10	16.02	3
28	10,80	11,75	12,68	13,60	14,53	15.47	16.38	2
29	11,15	12,08	13,03	13,95	14,88	15.82	16.75	1
30	11,51	12,45	13,38	14,31	15,25	16.18	17.10	0
	♑ North Latitude.				♍ South Latitude.			

A Table of Declinations.

♈ South Latitude. ♎ North Latitude

	0	1	2	3	4	5	6	
0		0,92	1,83	2,75	3,67	4,58	5,50	30
1		0,52	1,45	2,35	3,27	4,18	5,10	29
2		0,12	1,05	1,95	2,87	3,78	4,70	28
3		0 28	0,65	1,57	2,48	3,40	4,32	27
4		0,68	0,25	1,17	2,08	3,00	3,92	26
5		1,08	0,15	0,77	1,68	2,60	3,52	25
6		1,47	0,55	0,37	1,28	2,03	3,12	24
7		1,87	0,95	0,03	0,88	1,80	2,72	23
8		2,27	1,35	0,43	0,48	1,42	2,33	22
9		2,48	1,75	0,82	0,10	1,03	1,95	21
10		3,05	2,13	1,22	0,30	0,63	1,55	20
11		3,45	2,53	1,61	0,68	0,23	1,15	19
12		3,85	2,93	2,01	1,07	0,17	0,77	18
13		4,23	3,32	2,40	1,47	0,55	0,38	17
14		4,62	3,68	2,95	1,87	0,93	0,00	16
15		5,00	4,08	3,17	2,25	1,32	0,38	15
16		5,38	4,47	3,53	2,63	1,68	0,77	14
17		5,77	4,85	3,92	3,00	2,07	1,15	13
18		6,15	5,23	4,30	3,38	2,45	1,53	12
19		6,53	5,62	4,68	3,77	2,83	1,92	11
20		6,92	5,98	5,07	4,13	3,20	2,28	10
21		7,28	6,35	5,45	4,50	3,57	2,65	9
22		7,67	6,73	5,83	4,88	3,95	3,02	8
23		8,05	7,12	6,20	5,25	4,32	3,38	7
24		8,42	7,50	6,57	5,63	4,70	3,75	6
25		8,78	7,87	6,93	6,00	5,07	4,12	5
26		9,15	8,23	7,30	6,37	5,43	4,48	4
27		9,51	8,58	7,83	6,72	5,78	4,83	3
28		9,88	8,95	8,02	7,07	6,13	5,18	2
29		10,23	9,30	8,37	7,42	6,48	5,53	1
30		10,58	9,65	8,72	7,77	6,83	5,88	0

♑ North Latitude. ♍ South Latitude.

A Table of Declinations.

♉ North Latitude. ♏ South Latitude.

	0	1	2	3	4	5	6	
0	11,51	12,45	13,38	14,31	15,25	16,18	17,10	30
1	11,87	12,80	13,73	14,67	15,60	16,55	17,47	29
2	12,22	13,15	14,08	15,02	15,95	16,19	17,82	28
3	12,55	13,48	14,42	15,35	16,30	17,23	18,17	27
4	12,90	13,83	14,78	15,70	16,65	17,58	18,52	26
5	13,23	14,18	15,12	16,05	17,00	17,93	18,87	25
6	13,57	14,52	15,45	16,40	17,33	18,28	19,20	24
7	13,90	14,85	15,78	16,73	17,67	18,58	19,53	23
8	14,23	15,18	16,12	17,07	18,00	18,95	19,87	22
9	14,55	15,50	16,43	17,38	18,33	19,28	20,20	21
10	14,87	15,82	16,75	17,70	18,65	19,60	20,53	20
11	15,18	16,13	17,07	18,02	18,97	19,92	20,85	19
12	15,48	16,43	17,38	18,33	19,23	20,23	21,17	18
13	15,80	16,75	17,70	18,65	19,60	20,55	21,48	17
14	16,10	17,05	18,00	18,95	19,90	20,87	21,80	16
15	16,40	17,35	18,30	19,25	20,20	21,17	22,10	15
16	16,68	17,63	18,60	19,55	20,50	21,63	22,40	14
17	16,97	17,92	18,83	19,85	20,80	21,77	22,70	13
18	17,25	18,20	19,17	20,13	21,08	22,05	22,98	12
19	17,53	18,48	19,45	20,42	21,37	22,33	23,27	11
20	17,86	18,77	19,73	20,68	21,65	22,62	23,55	10
21	18,07	19,03	20,00	20,95	21,92	22,88	23,83	9
22	18,33	19,30	20,27	21,22	22,18	23,15	24,10	8
23	18,58	19,57	20,53	21,48	22,45	23,42	24,37	7
24	18,83	19,82	20,78	21,75	22,72	23,68	24,63	6
25	19,08	20,05	21,03	22,00	22,97	23,93	24,88	5
26	19,32	20,28	21,27	22,23	23,20	24,18	25,13	4
27	19,55	20,52	21,50	22,47	23,43	24,42	25,37	3
28	19,78	20,75	21,73	22,70	23,67	24,65	25,60	2
29	20,00	20,98	21,95	22,93	23,90	24,88	25,83	1
30	20,22	21,20	22,17	23,15	24,12	25,10	26,05	0

♌ North Latitude. ♒ South Latitude.

A Table of Declinations.

♉ South Latitude. ♏ North Latitude

	0	1	2	3	4	5	6	
0		10,58	09,65	8,72	7,77	6,83	5,88	30
1		10,93	10,00	9,07	8,12	7,18	6,23	29
2		11,28	10,33	9,40	8,47	7,52	6,57	28
3		11,62	10,67	9,73	8,80	7,85	6,90	27
4		11,97	11,02	10,07	9,13	8,18	7,23	26
5		12,30	11,35	10,40	9,47	8,52	7,57	25
6		12,63	11,68	10,73	9,80	8,87	7,83	24
7		12,97	12,01	11,07	10,12	9,17	8,20	23
8		13,28	12,33	11,38	10,47	9,48	8,52	22
9		13,60	12,65	11,70	10,75	9,80	8,83	21
10		13,92	12,97	12,02	11,07	10,12	9,15	20
11		14,23	13,28	12,33	11,38	10,48	9,45	19
12		14,53	13,58	12,63	11,68	10,72	9,75	18
13		14,83	13,88	12,93	11,98	11,02	10,05	17
14		15,23	14,18	13,23	12,28	11,32	10,35	16
15		15,43	14,48	13,53	12,57	11,60	10,63	15
16		15,72	14,77	13,80	12,85	11,88	10,92	14
17		16,00	15,05	14,08	13,13	12,17	11,20	13
18		16,28	15.33	14,37	13,40	12,43	11,47	12
19		16,57	15.60	14,63	13,67	12,70	11,73	11
20		16,83	15.87	14,90	13,93	12,97	12,00	10
21		17,10	16.13	15,17	14,20	13,23	12,25	9
22		17,37	16.40	15,43	14,47	13,48	12,50	8
23		17,62	16.65	15,68	14,72	13,73	12,75	7
24		17,87	16.90	15,93	14,97	13,98	13,00	6
25		18,12	17.15	16,17	15,20	14,22	13,23	5
26		18,35	17.38	16,42	15,43	14,45	13,48	4
27		18,58	17.60	16,63	15,65	14,68	13,68	3
28		18,80	17.83	16,85	15,87	14,90	13,90	2
29		19,02	18.05	17,07	16,08	15,12	14,12	1
30		19,23	18.27	17,28	16,30	15,33	14,35	0

♌ South Latitude. ♏ North Latitude.

A Table of Declinations.

	♓ North Latitude.				♌ South Latitude.			
	0	1	2	3	4	5	6	
0	20,22	21,20	22,17	23,15	24,12	25,10	26,05	30
1	20,43	21,42	22,38	23,37	24,33	25,32	26,27	29
2	20,63	21,62	22,60	23,58	24,55	25,53	26,48	28
3	20,83	21,82	22,80	23,78	24,75	25,73	26,70	27
4	21,02	22,00	22,98	23,97	24,95	25,93	26,90	26
5	21,22	22,18	23,17	24,15	25,13	26,12	27,08	25
6	21,38	22,37	23,35	24,35	25,32	26,30	27,35	24
7	21,55	22,53	23,52	24,52	25,50	26,48	27,45	23
8	21,72	22,70	23,68	24,68	25,67	26,65	27,62	22
9	21,88	22,87	23,85	24,85	25,83	26,82	27,78	21
10	22,03	23,02	24,00	25,00	25,98	26,97	27,93	20
11	22,17	23,17	24,15	25,15	26,13	27,12	28,08	19
12	22,32	23,32	24,30	25,30	26,28	27,27	28,23	18
13	22,45	23,45	24,43	25,43	26,42	27,40	28,37	17
14	22,57	23,57	24,55	25,55	26,53	27,52	28,50	16
15	22,68	23,68	24,67	25,65	26,65	27,63	28,62	15
16	22,78	23,72	24,77	25,75	26,75	27,75	28,72	14
17	22,88	23,88	24,88	25,87	26,87	27,87	28,82	13
18	22,98	23,98	24,98	25,97	26,97	27,97	28,92	12
19	23,07	24,07	25,07	26,05	27,05	28,05	29,03	11
20	23,15	24,15	25,15	26,13	27,13	28,13	29,12	10
21	23,22	24,22	25,22	26,22	27,20	28,20	29,20	9
22	23,28	24,28	25,28	26,28	27,27	28,27	29,25	8
23	23,33	24,33	25,33	26,33	27,32	28,32	29,30	7
24	23,38	24,38	25,38	26,38	27,37	28,37	29,37	6
25	23,43	24,43	25,43	26,43	27,42	28,42	29,42	5
26	23,47	24,47	25,47	26,47	27,47	28,47	29,47	4
27	23,49	24,50	25,50	26,50	27,50	28,50	29,50	3
28	23,50	24,51	25,51	26,51	27,51	28,51	29,51	2
29	23,51	24,52	25,52	26,52	27,52	28,52	29,52	1
30	23,52	24,52	25,52	26,52	27,52	28,52	29,52	0
	♈ South Latitude.				♎ North Latitude.			

A Table of Declinations.

♊ South Latitude. ♐ North Latitude.

	0	1.	2	3	4	5	6	
0		19,23	18,27	17,28	16,30	15,53	14.35	30
1		19,45	18,47	17,48	16,50	15,53	14.55	29
2		19,52	18,67	17,68	16,70	15,73	14.75	28
3		19,85	18,87	17,88	16,90	15,92	14.95	27
4		20,03	19,05	18,05	17,10	16,12	15.15	26
5		20,23	19,25	18,27	17,28	16,50	15.30	25
6		20,40	19,42	18,43	17,45	16,47	15.47	24
7		20,57	19,58	18,60	17,62	16,63	15.63	23
8		20,73	19,75	18,77	17,78	16,78	15.80	22
9		20,90	19,92	18,93	17,93	16,93	15.95	21
10		21,05	20,07	19,08	18,08	17,10	16.08	20
11		21,18	20,18	19,22	18,22	17,23	16.22	19
12		21,32	20,33	19,35	18,35	17,37	16.35	18
13		21,45	20,47	19,47	18,48	17,48	16.47	17
14		21,58	20,58	19,58	18,60	17,60	16.58	16
15		21,68	20,68	19,68	18,70	17,70	16.70	15
16		21,78	20,78	19,78	18,80	17,80	16.80	14
17		21,88	20,88	19,88	18,90	17,90	16.90	13
18		21,98	20,98	19,98	19,00	18,00	16.98	12
19		22,07	21,07	20,07	19,08	18,08	17.07	11
20		22,15	21,15	20,15	19,17	18,17	17.15	10
21		22,22	21,22	20,22	19,23	18,23	17.23	9
22		22,28	21,28	20,28	19,28	18,28	17.2	8
23		22,33	21,33	20,33	19,33	18,33	17.33	7
24		22,38	21,38	20,38	19,38	18,38	17.38	6
25		22,43	21,43	20,43	19,43	18,43	17.43	5
26		22,47	22,47	20,47	19,47	18,47	17.47	4
27		22,50	21,50	20,50	19,50	18,50	17.50	3
28		22,51	21,51	20,51	19,51	18,51	17.51	2
29		22,52	21,52	20,52	19,52	18,52	17.52	1
30		22,52	21,52	20,52	19,52	18,52	17.52	0

♈ North Latitude. ♎ South Latitude.

A Table of Declinations.

♈ North Latitude. ♎ South Latitude.

	0	1	2	3	4	15	06
0	0,00	359,62	359,22	358,82	358,42	358.02	357.62
1	0,92	0,53	0,13	359,73	359,33	358.93	358.53
2	1,83	1,45	1,05	0,65	0,25	359.85	359.45
3	2,75	2,37	1,97	1,57	1,17	0.77	0.37
4	3,67	3,28	2,88	2,48	2,08	1.68	1.28
5	4,58	4,20	3,80	4,40	3,00	2.60	2.20
6	5,50	5,12	4,72	4,32	3,92	3.52	3.12
7	6,42	6,03	5,63	5,23	4,83	4.43	4.03
8	7,35	6,95	6,55	6,15	5,75	5.35	4.95
9	8,27	7,87	7.47	7,07	6,67	6.27	5.87
10	9,18	8,78	8,38	7,98	7,58	7.18	6.78
11	10,10	9,70	9,30	8,92	8,52	8.12	7.72
12	11,03	10,63	10,23	9,85	9,45	9.05	8.65
13	11,95	11,55	11,15	10,77	10,37	9.97	9.57
14	12,88	12,48	12,08	11,70	11,30	10.90	10.50
15	13,80	13,42	13,02	12,63	12,23	11.67	11.43
16	14,73	14,33	13,95	13,57	13,17	12.77	12.37
17	15,67	15,27	14,88	14,50	14,10	13.70	13.30
18	16,58	16,20	15,82	15,43	15,03	14.65	14.25
19	17,52	17,13	16,75	16,37	15,97	15.58	15.18
20	18,45	18,07	17,68	17,30	16,90	16.52	16.12
21	19,38	19,00	18,62	18,23	17,85	17.47	17.07
22	20,33	19,93	19,55	19,18	18,80	18.42	18.01
23	21,27	20,88	20,50	20,13	19,75	19.37	19.97
24	22,20	21,83	21,45	21,08	20,70	20.32	20.92
25	23,15	22,78	22,40	22,03	21,65	11.27	21.87
26	24,10	23,73	23,35	22,98	22,60	22.22	22.83
27	25,03	24,68	44,32	23,95	23,57	23.18	23.80
28	25,98	25,63	25,27	24,90	24,52	24.15	24.77
29	26,95	26,58	26,22	25,85	25,48	25.12	25.73
30	27,90	27,55	27,18	26,82	26,45	26.08	26.70

A Table of Right Ascensions.

♈ South Latitude ♎ North Latitude. 18c. Adde.

	0	1	2	3	4	5	6
0		0,38	0,78	1,18	1,58	1,98	2,38
1		1,30	1,70	2,10	2,50	2,90	3,30
2		2,21	2,62	3,02	3,42	3,82	4,22
3		3,13	3,53	3,93	4,33	4,73	5,13
4		4,05	4,45	4,85	5,25	5,65	6,05
5		4,97	5,37	5,77	6,17	6,57	6,97
6		5,90	6,30	6,70	7,10	7,50	7,88
7		6,82	7,22	7,62	8,02	8,42	8,80
8		7,73	8,13	8,53	8,93	9,33	9,72
9		8,66	9,07	9,47	9,85	10,25	10,63
10		9,58	9,98	10,38	10,77	11,17	11,55
11		10,50	10,90	11,30	11,68	12,08	12,47
12		11,42	11,82	12,22	12,60	13,00	13,38
13		12,33	12,73	13,13	13,52	13,92	14,30
14		13,27	13,65	14,05	14,43	14,83	15,22
15		14,20	14,58	14,97	15,35	15,75	16,13
16		15,12	15,50	15,88	16,27	16,67	17,05
17		16,03	16,42	16,80	17,18	17,58	17,97
18		16,97	17,35	17,73	18,12	18,50	18,88
19		17,90	18,28	18,67	19,03	19,42	19,80
20		18,83	19,22	19,60	19,97	20,35	20,72
21		19,76	20,15	20,53	20,90	21,28	21,65
22		20,70	21,08	21,47	21,83	22,20	22,57
23		21,63	22,01	22,40	22,77	23,13	23,50
24		22,58	22,95	23,33	23,70	24,07	24,43
25		23,52	23,88	24,27	24,63	25,00	25,35
26		24,47	24,83	25,20	25,57	25,93	26,28
27		25,42	25,78	26,15	26,50	26,87	27,22
28		26,37	26,72	27,08	27,43	27,80	28,15
29		27,32	27,67	28,02	28,37	28,73	29,08
30		28,27	28,63	28,97	29,32	29,67	30,02

A Table of Right Ascensions.

♉ North Latitude. ♏ South Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	27,90	27,55	27,18	26,82	26,45	26,08	25,70
1	28,85	28,50	28,13	27,78	27,42	27,05	26,67
2	29,82	29,45	29,10	28,75	28,38	28,02	27,63
3	30,77	30,42	30,07	29,72	29,35	28,98	28,62
4	31,72	31,38	31,03	30,68	30,32	29,97	29,60
5	32,70	32,37	32,00	31,65	31,30	30,95	30,58
6	33,67	33,33	32,97	32,63	32,28	31,93	31,57
7	34,63	34,30	33,96	33,62	33,27	32,92	32,56
8	35,60	35,28	34,95	34,61	34,26	33,91	33,55
9	36,57	36,27	35,93	35,60	35,25	34,90	34,55
10	37,55	37,25	36,92	36,59	36,25	35,90	35,55
11	38,55	38,23	37,91	37,58	37,25	36,91	36,56
12	39,53	39,23	38,90	38,58	38,25	37,92	37,57
13	40,52	40,22	39,90	39,58	39,26	38,93	38,58
14	41,51	41,21	40,90	40,59	40,27	39,95	39,60
15	42,51	42,21	41,90	41,60	41,28	40,97	40,63
16	43,51	43,21	42,91	42,61	42,30	41,98	41,65
17	44,51	44,22	43,92	43,62	43,32	43,00	42,67
18	45,52	45,23	44,93	44,63	44,33	44,02	43,70
19	46,53	46,24	45,95	45,65	45,35	45,05	44,73
20	47,53	47,25	46,97	46,67	46,38	46,08	45,77
21	48,55	48,27	47,98	47,70	47,42	47,12	46,82
22	49,57	49,28	49,00	48,73	48,45	48,15	47,87
23	50,58	50,30	50,03	49,77	49,48	49,20	48,92
24	51,60	51,33	51,07	50,80	50,53	50,25	49,97
25	52,63	52,37	52,10	51,85	51,58	51,30	51,03
26	53,67	52,40	53,15	52,90	52,63	52,37	52,10
27	54,70	54,45	54,20	53,95	53,70	53,43	53,17
28	55,73	55,48	55,25	55,00	54,75	54,50	54,23
29	56,77	56,53	56,30	56,05	55,82	55,57	55,30
30	57,80	57,58	57,35	57,12	56,88	56,63	56,38

A Table of Right Ascensions.

♑ South Latitude. ♋ North Latitude. 180. Adde.

	0	1	2	3	4	5	6
0		28,27	28.62	28,97	29,32	29,67	30,02
1		29,22	29.57	29,92	30,27	30,62	30,95
2		30,17	30.52	30,87	31,22	31,57	31,90
3		31,12	31.47	31,82	32,17	32,52	32,85
4		32,08	32.42	32,77	33,12	33,45	33,78
5		33,05	33.38	33,72	34,07	34,40	34,73
6		34,02	34.35	34,68	35,02	35,35	35,68
7		34,98	35.32	35,65	35,97	36,30	36,63
8		35,95	36.28	36,62	56,93	37,25	37,58
9		36,93	37.25	37,58	37,90	38,22	38,53
10		37,90	38.22	38,55	38,87	39,18	39,48
11		38,88	39,20	39,52	39,83	40,15	40,45
12		39,87	40.18	40,50	40,80	41,12	41,42
13		40,85	41.17	41,47	41,77	42,08	42,38
14		41,83	42,15	42,45	42,75	43,05	43,35
15		42,82	43,13	43,43	43,73	44,03	44,32
16		43,81	44,12	44,42	44,72	45,00	45,28
17		44,81	45,11	45,40	45,70	45,98	46,25
18		45,81	46,10	46,39	46,68	46,97	47,23
19		46,82	47,10	47,38	47,67	47,95	48,22
20		47,82	48,10	48,38	48,66	48,93	49,20
21		48,83	49,10	49,38	49,65	49,92	50,18
22		49,84	50,10	50,38	50,64	50,90	51,17
23		50,85	51,11	51,38	51,63	51,89	52,15
24		51,87	52,12	52,39	52,63	52,88	53,14
25		52,88	53,13	53,39	53,63	53,88	54,13
26		53,92	54,15	54,40	54,64	54,88	55,12
27		54,93	55,18	55,42	55,65	55,89	56,12
28		55,97	56,20	56,43	56,67	56,90	57,11
29		57,00	57,22	57,45	57,68	57,91	58,12
30		58,03	58,25	58,48	58,70	58,92	59,12

A Table of Right Ascensions.

♊ North Latitude ♐ South Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	57,80	57.58	57,35	57,12	56,88	56,63	56,38
1	58,85	58.63	58,40	58,17	57,95	57,70	57,47
2	59,88	59.68	59,45	59,23	59,02	58,78	58,55
3	60,93	60.73	66,52	60,30	60,08	59,87	59,63
4	61,98	61.78	61,58	61,37	61,17	60,95	60,73
5	63,05	62.85	62,65	62,45	62,25	62,03	61,83
6	64,10	63.92	63,72	63,53	63,33	63,13	62,93
7	65,15	64.98	64,78	64,62	64,42	64,22	64,03
8	66,22	66.05	65,87	65,70	65,50	65,32	65,13
9	67,28	67.12	66,95	66,78	66,60	66,42	66,23
10	68,35	68.18	68,03	67,87	67,70	67,52	67,35
11	69,42	69.27	69,12	68,95	68,80	68,63	68,47
12	70,48	70.35	70,20	70,05	69,90	69,75	69,58
13	71, 7	71.43	71,28	71,15	71,00	70,85	70,70
14	72,63	72.52	72,37	72,25	72,10	71,97	71,82
15	73,70	73.60	73,47	73,35	73,22	73,08	72,95
16	74,78	74.68	74,55	74,45	74,32	74,20	74,07
17	75,87	75.77	75,65	75,55	75,43	75,32	75,20
18	76,95	76.85	76,75	76,65	76,55	76,45	76,33
19	78,03	77.93	77,85	77,75	77,67	77,57	77,47
20	79,12	79.03	78,95	78,87	78,78	78,68	78,60
21	80,20	80.13	80,05	79,98	79,90	79,82	79,73
22	81,28	81.22	81,15	81,08	81,02	80,93	80,87
23	82,37	82.30	82,25	82,18	82,13	82,07	82,00
24	83,47	83.40	83,35	83,30	83,25	83,20	83,15
25	84,55	84.50	84,45	84,42	84,37	84,33	84,28
26	85,63	84.60	85,55	85,53	85.48	85,47	85,38
27	86,73	86.70	86,67	86,65	86.61	86,60	86,57
28	87,82	87.80	87,77	87,73	87.78	87,73	87,70
29	88,92	88.90	88,88	88,88	88:87	88,87	88,85
30	90,00	90.00	90,00	90,00	90.00	90,00	90,00

A Table of Right Ascensions.

II South Latitude. ☌ North Latitude. 180 Adde.

	0	1	2	3	4	5	6
0		58,03	58,25	58,48	58,70	58,92	59,12
1		59,07	59,28	59,50	59,72	59,92	60,13
2		60,10	60,32	60,52	60,73	60,93	61,13
3		61,15	61,35	61,55	61,77	61,95	62,14
4		62,18	62,38	62,58	62,80	62,97	63,15
5		63,23	63,42	63,62	63,83	63,98	64,17
6		64,28	64,47	64,65	64,87	65,02	65,18
7		65,33	65,52	65,68	65,90	66,03	66,20
8		66,38	66,57	66,73	66,93	67,07	67,22
9		67,45	67,52	67,77	67,97	68,10	68,25
10		68,50	68,67	68,82	68,98	69,12	69,27
11		69,57	69,72	69,87	70,01	70,15	70,28
12		70,63	70,77	70,92	17,05	71,18	71,32
13		71,70	71,82	71,97	72,08	72,22	72,35
14		72,77	72,88	73,02	73,13	73,25	73,38
15		73,83	73,95	74,07	74,18	74,30	74,42
16		74,90	75,02	75,12	75,23	75,33	75,45
17		75,97	76,08	76,18	76,28	76,38	76,48
18		77,05	77,15	77,25	77,33	77,43	77,52
19		78,12	78,22	78,30	78,38	78,47	78,55
20		79,20	79,28	79,35	79,43	79,52	79,58
21		80,28	80,35	80,42	80,48	80,57	80,63
22		81,35	81,42	81,47	81,53	81,60	81,67
23		82,42	82,48	82,53	82,58	82,65	82,70
24		83,50	83,55	83,60	83,65	83,70	83,75
25		84,58	84,62	84,67	84,70	84,75	84,78
26		85,67	85,68	85,73	85,75	85,80	85,82
27		86,75	86,77	86,80	86,82	86,85	86,87
28		87,83	87,83	87,87	87,87	87,90	87,90
29		88,92	88,92	88,93	88,93	88,95	88,95
30		90,00	90,00	90,00	90,00	90,00	90,00

A Table of Right Ascensions.

☊ North Latitude ☋ South Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	90,00	90,00	90,00	90.00	90,00	90,00	90,90
1	91,08	91,10	91,12	91.12	91,13	91,13	91,15
2	92,18	92,20	92,23	92.23	92,27	92,27	92,30
3	93,27	93,30	93,33	93.35	93,38	93,40	93,43
4	94,37	94,40	94,45	94.47	94,52	94,53	94,62
5	95,45	95,50	95,55	95.58	95,63	95,67	95,72
6	96,53	96,60	96,65	96.70	96,75	96,80	96,85
7	97,63	97,70	97,75	97.82	97,87	97,93	98,00
8	98,72	98,78	98,85	98.92	99,98	99,07	99,13
9	99,80	99,87	99,95	100.02	100,10	100,18	100,27
10	100,88	100,97	101,05	101.13	101,22	101,32	101,40
11	101,97	102,07	102,15	102.25	102,33	102,43	102,53
12	103,05	103,15	103,25	103.35	103,45	103,55	103,67
13	104,13	104,23	104,35	104.45	104,57	104,68	104,80
14	105,22	105,32	105,45	105.55	105,68	105,80	105,93
15	106,30	106,40	106,53	106.65	106,78	106,92	107,05
16	107,37	107,48	107,63	107.75	107,90	108,03	108,18
17	108,43	108,57	108,72	108.85	108,00	109,15	109,30
18	109,52	109,65	109,80	109.95	110,10	110,25	110,42
19	110,58	110,73	110,88	111.05	111,20	111,37	111,53
20	111,65	111,82	111 97	112.13	112,30	112,48	112,65
21	112,71	112,88	113,05	113.22	113,40	113,58	113,77
22	113,78	113,95	114,13	114.30	114,50	114,68	114,87
23	114,85	115,02	115,22	115.38	115,58	115,78	115,97
24	115,90	116,08	116,28	116 47	116,67	116,87	117,07
25	116,95	117,15	117,35	117.55	117,75	117,97	118.17
26	118,02	118,22	118,42	118.63	118,83	119,05	119.27
27	119,07	119,27	119,48	119.70	119,92	120,13	120.37
28	120,12	120,32	120,55	120.77	120,98	122,22	121.45
29	121,15	121,37	121,60	121.83	122,05	122,30	122.53
30	122,20	122,42	122,65	122.88	123,12	123,37	123.62

A Table of Right Ascensions.

♋ South Latitude. ♈ North Latitude. 180 Adde.

	0	1	2	3	4	5	6
0		90,00	90,00	90,00	90,00	90,00	90,00
1		91,08	91,08	91,07	91,07	91,05	91,05
2		92,17	92,17	92,13	92,13	92,10	92,10
3		93,25	93,23	93,20	93,18	93,15	93,13
4		94,33	94,32	94,27	94,25	94,20	94,18
5		95,42	95,38	95,33	95,30	95,25	95,22
6		96,50	96,45	96,40	96,35	96,30	96,25
7		97,58	97,52	97,47	97,42	97,35	97,30
8		98,65	98,58	98,53	98,47	98,40	98,33
9		99,72	99,65	99,58	99,52	99,43	99,37
10		100,80	100,72	100,65	100,57	100,48	100,42
11		101,88	101,78	101,70	101,62	101,53	101,45
12		102,95	102,85	102,75	102,67	102,57	102,48
13		104,03	103,92	103,82	103,72	103,62	103,52
14		105,10	104,98	104,88	104,77	104,67	104,55
15		106,17	106,05	105,93	105,82	105,70	105,58
16		107,23	107,12	106,98	106,87	106,75	106,62
17		108,30	108,18	108,03	107,92	107,78	107,65
18		109,37	109,23	109,08	108,95	108,82	108,68
19		110,43	110,28	110,13	110,99	110,85	109,72
20		111,50	111,33	111,18	111,01	111,88	110,73
21		112,55	112,38	112,23	112,03	112,90	111,75
22		113,62	113,42	113,27	113,07	113,93	112,78
23		114,67	114,48	114,32	114,10	114,97	113,80
24		115,72	115,53	115,35	115,13	115,98	114,82
25		116,77	116,58	116,38	116,17	116,02	115,83
26		117,82	117,62	117,42	117,20	117,03	116,85
27		118,85	118,65	118,45	118,23	118,05	117,86
28		119,90	119,68	119,48	119,27	119,07	118,87
29		120,93	120,72	120,50	120,28	120,08	119,88
30		121,97	121,75	121,52	121,30	121,08	120,88

A Table of Right Ascensions.

♌ North Latitude ♒ South Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	122,20	122,42	122,65	122,88	123,12	123.37	123.63
1	123,23	123,47	123,70	123,95	124,18	124.43	124.70
2	124,27	124,52	124,75	125,00	125,25	125.50	125.77
3	125,30	125,55	125,80	126,05	126,30	126.57	126.83
4	126,33	126,60	126,85	127,10	127,37	127.63	127.90
5	127,37	127,63	127,90	128,15	128,42	128.70	128.97
6	128,40	128,67	128,93	129,20	129,47	129.75	130.03
7	129,42	129,70	129,97	130,23	130,52	130.80	131.08
8	130,43	130,72	131,00	131,27	131,55	131.85	232.13
9	131,45	131,73	132,02	132,30	132,58	132.88	133.18
10	132,46	132,75	133,03	133,33	133,62	133.92	134.23
11	133,47	133,77	134,05	134,35	134,65	134.95	135.27
12	134,48	134,78	135,07	135,37	135,67	135.98	136.30
13	135,48	135,78	136,08	136,38	136,68	137.00	137.33
14	136,49	136,79	137,09	137,39	137,70	138.02	138.35
15	137,49	237,79	138,09	138,40	138,72	139.03	139.37
16	138,48	138,78	139,10	139,41	139,73	140.05	140.40
17	139,47	139,78	140,10	040,41	140,74	141.07	141.42
18	140,46	140,77	141,09	141,42	141,74	142.08	142.43
19	141,45	141,76	142,09	142,41	142,75	143.09	143.44
20	142,43	142,75	143,08	143,41	143,75	144.10	144.44
21	143,41	143,73	144,07	144,40	144,74	145.10	145.45
22	144,38	144,72	145,05	145,39	145,74	146.09	146.45
23	145,36	145,70	146,03	146,38	146,73	147.08	147.44
24	146,33	146,67	147,02	147,37	147,72	148.07	148.43
25	147,30	147,65	148,00	148,35	148,70	149.05	149.42
26	148,27	148,62	148,97	149,32	149,68	150.03	150.40
27	149,23	149,58	149,93	150,28	150,65	151,01	151.38
28	150,18	150,55	150,90	151,25	151,62	151.98	152.37
29	151,15	551,50	151,87	152,22	152,52	152.95	153.33
30	152,10	152,45	152,82	153,18	153,55	153.92	154.30

A Table of Right Ascensions.

℞ South Latitude ♒ North Latitude, 180. Adde.

	0	1	2	3	4	5	6
0		121,97	121,75	121,52	121,30	121,08	120.88
1		123,00	122,78	122,55	122,32	122,09	121.88
2		124,03	123,80	123,57	123,33	123,10	122.89
3		125,07	124,82	124,58	124,35	124,11	123.88
4		126,08	125,85	125,60	125,36	125,12	123.88
5		127,12	126,87	126,61	126,37	126,12	125.87
6		128,13	127,88	127,61	127,37	127,12	126.86
7		129,15	128,89	128,62	128,37	128,11	127.85
8		130,16	129,90	129,62	129,36	129,10	128.83
9		131,17	130,90	130,62	130,35	130,08	129.82
10		132,18	131,90	131,62	131,34	131,07	130.80
11		133,18	132,90	132,62	132,33	132,05	131.78
12		134,19	133,90	133,61	133,32	133,03	132.77
13		135,19	134,89	134,60	134,30	134,02	133.75
14		136,19	135,88	135,58	135,28	135,00	134.72
15		137,18	136,87	136,57	136,27	135,97	135.68
16		138,17	137,85	137,55	137,25	136,95	136.65
17		139,15	138,83	138,53	138,23	137,92	137.62
18		140,13	139,82	139,50	139,20	138,88	138.58
19		141,12	140,80	140,48	140,17	139,85	139.55
20		142,10	141,78	141,45	141,13	140,82	140.52
21		143,07	142,75	142,42	142,10	141,78	141.47
22		144,05	143,72	143,38	143,07	142,75	142.42
23		145,02	144,68	144,35	144,03	143,50	143.37
24		145,98	145,65	145,32	144,98	144,65	144.32
25		146,95	146,62	146,28	145,93	145,60	145.27
26		147,92	147,58	147,23	146,88	146,55	146.22
27		148,88	148,53	148,18	147,83	147,48	147.15
28		149,83	149,48	149,13	148,78	148,43	148.10
29		150,77	150,43	150,08	149,73	149,38	149.05
30		151,73	151,38	151,03	150,68	150,33	149.98

A Table of Right Ascensions.

♍ North Latitude. ♓ South Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	152,10	152,45	152,82	153.18	153,55	153,92	154,30
1	153,05	153,42	153,78	154.15	154,52	154,88	155,27
2	154,02	154,37	154,73	155.10	155,48	155,85	156,23
3	154,97	155,32	155,68	156.05	156,43	156,82	157,20
4	155,90	156,27	156,65	157.02	157,40	157,78	158,17
5	156,85	157,22	157,60	157.97	158,35	158,73	159,13
6	157,80	258,17	158,55	158.92	159,30	159,68	160,08
7	158,73	159,12	159,50	159.87	160,25	160,63	161,03
8	159,67	160,07	160,45	160.82	161,20	161,58	161,99
9	160,62	161,00	161,38	161.77	162,15	162,53	162,93
10	161,55	161,93	162,32	162.70	163,10	163,48	163,88
11	162,48	162,87	163,25	163.63	164,03	164,42	164,82
12	163,42	163,80	164,18	164.57	164,97	165,35	165,75
13	164,33	164,73	165,21	165.50	165,90	166,30	166,70
14	165,27	165,67	166,05	166.43	166,83	167,23	167,63
15	166,20	166,58	166,98	167.37	167,77	168,33	168,57
16	167,12	167,52	167,92	168.30	168,70	169,10	169,50
17	168,05	168,45	168,85	569.23	169,62	170,03	170,43
18	168,97	169,37	169,77	170.15	170,55	170,95	171,35
19	169,90	170,30	170,70	171.08	171,48	171,88	172,28
20	170,82	171,22	171,62	172.02	172,42	172,82	173,22
21	171,73	172,13	172,53	172.93	173,33	173,73	174,13
22	172,65	173,05	173,45	173.85	174,25	174,65	175,05
23	173,58	173,97	174,37	174.77	175,17	175,57	175,97
24	174,50	174,88	175,28	175.68	176,08	176,48	176,88
25	175,42	175,80	176,20	176.60	177,00	177,40	177.80
26	176,33	176,72	177,12	177.52	177,93	178,32	178.72
27	177,25	177,63	178,03	178.43	178,83	179,23	179.63
28	178,17	178,55	178,95	179.35	579,75	180,15	180.55
29	179,08	179,47	179,87	180 27	180,67	181,07	181.47
30	180,00	180,38	180,78	181.18	181,58	181,98	182.38

A Table of Right Ascensions.

♒ South Latitude ♓ North Latitude. 180 Adde.

	0	1	2	3	4	5	6
0	152	151,73	151,37	151,03	150,68	150,33	149,98
1	153	152,68	152,33	151,98	551,63	151,27	150,92
2	154	153,62	153,28	152,92	152,57	152,20	151,85
3	154	154,58	154,22	153,85	153,50	153,13	152,78
4	155	155,52	155,17	154,80	154,45	154,07	153,72
5	156	156,48	156,12	155,73	155,37	155,00	154,65
6	157	157,42	157,05	156,67	156,30	155,93	155,57
7	158	158,37	157,99	157,60	157,23	156,87	156,50
8	159	159,30	158,92	158,53	158,17	157,80	157,43
9	160	160,23	159,85	159,47	159,10	158,72	158,35
10	161	161,17	160,78	160,40	160,03	159,65	159,28
11	162	162,10	161,72	161,33	160,97	160,58	160,20
12	163	163,03	162,65	162,27	161,88	161,50	161,12
13	164	163,97	163,58	163,20	162,82	162,42	162,03
14	165	164,88	164,50	164,12	163,73	163,33	163,95
15	166	165,80	165,42	165,03	164,65	164,25	163,87
16	167	166,73	166,35	165,95	165,57	165,17	164,78
17	168	167,67	167,27	166,87	166,48	166,08	165,70
18	168	168,58	168,18	167,78	167,40	167,00	166,62
19	169	169,50	169,10	168,70	168,32	167,92	167,53
20	170	170,42	170,02	169,62	169,23	168,83	168,45
21	171	171,34	170,93	170,53	170,15	169,75	169,37
22	172	172,27	171,87	171,47	171,07	170,67	170,28
23	173	173,18	172,78	172,38	171,98	171,58	171,20
24	174	174,10	173,70	173,30	172,90	172,50	172,12
25	175	175,03	174,63	174,23	173,83	173,43	173,03
26	176	175,95	175,55	175,15	174,75	174,35	173,95
27	177	176,87	176,47	176,07	175,67	175,27	174,87
28	178	177,78	177,38	176,98	176,58	176,18	175,78
29	179	178,70	17 ,30	177,90	177,50	177,10	176,70
30	179	179,62	179,32	178,82	178,42	178,02	177,62

A Table of Ascensional Differences.

Poles.	1	2	3	4	5	6	7
1	00,01	00,03	00,05	00,07	00,08	00,10	00,12
2	0,03	0,06	0,10	0,13	0,17	00,22	0,25
3	0,05	0,10	0,15	0,22	0,27	0,32	0,37
4	0,06	0,13	0,22	0,28	0,35	0,42	0,50
5	0,08	0,16	0,27	0,35	0,43	0,53	0,62
6	0,10	0,21	0,32	0,42	0,53	0,63	0,73
7	0,11	0,25	0,37	0,50	0,62	0,73	0,87
8	0,13	0,28	0,42	0,57	0,70	0,85	0,98
9	0,15	0,32	0,48	0,63	0,80	0,95	1,12
10	0,18	0,35	0,53	0,70	0,88	1,07	1,23
11	0,20	0,38	0,58	0,78	0,97	1,17	1,37
12	0,21	0,42	0,63	0,85	1,07	1,28	1,50
13	0,23	0,47	0,70	0,93	1,15	1,38	1,62
14	0,25	0,50	0,75	1,00	1,25	1,50	1,75
15	0,26	0,53	0,80	1,07	1,35	1,62	1,88
16	0,28	0,57	0,87	1,15	1,43	1,73	2,01
17	0,30	0,62	0,92	1,23	1,53	1,83	2,15
18	0,32	0,65	0,98	1,30	1,63	1,95	2,28
19	0,35	0,68	1,03	1,38	1,73	2,07	2,42
20	0,35	0,73	1,10	1,45	1,82	2,20	2,57
21	0,38	0,77	1,15	1,53	1,92	2,32	2,70
22	0,40	0,82	1,22	1,62	2,03	2,43	2,85
23	0,42	0,85	1,28	1,70	2,13	2,55	2,98
24	0,44	0,88	1,33	1,78	2,23	2,68	3,03
25	0,46	0,93	1,40	1,87	2,33	2,82	3,28
26	0,48	0,98	1,47	1,95	2,45	2,93	3,43
27	0,51	1,02	1,53	2,05	2,55	3,07	3,58
28	0,53	1,07	1,60	2,13	2,67	3,20	3,75
29	0,55	1,13	1,67	2,22	2,78	3,33	3,90
30	0,58	1,15	1,73	2,32	2,90	3,48	4,07
31	0,60	1,20	1,80	2,40	3,01	3,62	4,23
32	0,62	1,25	1,88	2,50	3,13	3,77	4,40

Degrees of Declination.

A Table of Ascensional Differences.

Degrees of Declination.	8	9	10	11	12	13	14
1	00,13	00.15	00,18	00,20	00,22	00,23	00,25
2	0,28	0.32	0,35	0,38	0,42	0,47	0,50
3	0,42	0.48	0,53	0,58	0,63	0,70	0,75
4	0,57	0.63	0,70	0,78	0,85	0,93	1,00
5	0,70	0.80	0,88	0,97	1,07	1,15	1,25
6	0,85	0.95	1.07	1,17	1,28	1,38	1,50
7	0,98	1.12	1,23	1,37	1,50	1,62	1,73
8	1,13	1.27	1,42	1,57	1,72	1,87	2,00
9	1,27	1.43	1,60	1,77	1,93	2,10	2,27
10	1,42	1.60	1,78	1,97	2,15	2,33	2,52
11	1,57	1.77	1,97	2,17	2,37	2,57	2,78
12	1,72	1.93	2,15	2,37	2,58	2,82	3,03
13	1,87	2.10	2,33	2,57	2,82	3,05	3,30
14	2,00	2.27	2,52	2,78	3,03	3,30	3,57
15	2,17	2.43	2,70	2,98	3,27	3,55	3,83
16	2,32	2.60	2,90	3,20	3,50	3,80	4,10
17	2,47	2.78	3,08	3,40	3,73	4,05	4,37
18	2,62	2.95	3,28	3,62	3,97	4,30	4,65
19	2,77	3.13	3,48	3,83	4,28	4,57	4,92
20	2,93	3.30	3,68	4,05	4,43	4,82	5,20
21	3,10	3.48	3,88	4,28	4,68	5,08	5,50
22	3,25	3.67	4,08	4,50	4,93	5,35	5,78
23	3,42	3.85	4,30	4,73	5,18	5,62	6,12
24	3,58	4.05	4,50	4,63	5,43	5,90	6,37
25	3,75	4.23	4,72	5,20	5,68	6,18	6,68
26	3,93	4.43	4,93	5,43	5,95	6,47	6,98
27	4,10	4.63	5,15	5,68	6.22	6,75	7,30
28	4,28	4.83	5,38	5,93	6.48	7,05	7,62
29	4,47	5.03	5,62	6,18	6.77	7,35	7,95
30	4,65	5.25	5,85	6,45	7:05	7,67	8,28
31	4,85	5.47	6,08	6,70	7.33	7,97	8,62
32	5,03	5.68	6,33	6,98	7.63	8,30	8,97

A Table of Ascensional Differences.

Degrees of Declination.	Poles. 15	16	17	18	19	20	21
1	00, 27	00, 28	00, 30	00, 32	00, 35	00, 37	00, 38
2	0, 53	0, 57	0, 62	0, 65	0, 68	0, 73	0, 77
3	0, 80	0, 87	0, 92	0, 98	1, 03	1, 10	1, 15
4	1, 07	1, 15	1, 23	1, 30	1, 38	1, 45	1, 53
5	1, 35	1, 27	1, 53	1, 63	1, 73	1, 82	1, 92
6	1, 62	1, 73	1, 83	1, 95	2, 07	2, 20	2, 32
7	1, 95	2, 01	2, 15	2, 28	2, 42	2, 57	2, 70
8	2, 15	2, 32	2, 47	2, 62	2, 77	2, 93	3, 10
9	2, 43	2, 60	2, 78	2, 95	3, 13	3, 30	3, 48
10	2, 70	2, 90	3, 08	3, 28	3, 48	3, 68	3, 88
11	2, 98	3, 20	3, 40	3, 62	3, 83	4, 05	4, 28
12	3, 27	3, 50	3, 73	3, 97	4, 20	4, 43	4, 68
13	3, 55	3, 80	4, 05	4, 30	4, 57	4, 82	5, 08
14	3, 83	4, 10	4, 37	4, 65	4, 92	5, 20	5, 50
15	4, 12	4, 40	4, 70	5, 00	5, 30	5, 60	5, 90
16	4, 40	4, 72	5, 03	5, 35	5, 67	5, 98	6, 32
17	4, 70	5, 03	5, 37	5, 70	6, 03	6, 38	6, 73
18	5, 00	5, 35	5, 70	6, 07	6, 42	6, 78	7, 17
19	5, 30	5, 67	6, 05	6, 42	6, 82	7, 20	7, 60
20	5, 60	5, 98	6, 38	6, 78	7, 20	7, 62	8, 03
21	5, 90	6, 32	6, 73	7, 17	7, 60	8, 03	8, 47
22	6, 22	6, 65	7, 10	7, 55	8, 00	8, 45	8, 92
23	6, 53	6, 98	7, 45	7, 93	8, 40	8, 88	9, 37
24	6, 85	7, 33	7, 82	8, 32	8, 82	9, 32	9, 83
25	7, 18	7, 68	8, 20	8, 72	9, 23	9, 77	10, 32
26	7, 52	8, 03	8, 58	9, 12	9, 67	10, 23	10, 78
27	7, 85	8, 40	8, 97	9, 53	10, 10	10, 68	11, 28
28	8, 18	8, 77	9, 35	9, 95	10, 55	11, 15	11, 78
29	8, 53	9, 15	9, 75	10, 38	11, 17	11, 63	12, 28
30	8, 90	9, 53	10, 17	10, 82	11, 47	12, 13	12, 80
31	9, 27	9, 92	10, 58	11, 27	11, 93	12, 63	13, 33
32	9, 63	10, 32	11, 01	11, 72	12, 42	13, 15	13, 88

A Table of Ascensional Differences.

Height.	22	23	24	25	26	27	28
1	00,40	00.42	00,45	00,47	00,48	00,51	00,53
2	0,82	0.85	0,88	0,93	0,98	1,03	1,07
3	1,22	1.28	1,33	1,40	1,47	1,53	1,60
4	1,62	1.70	1,78	1,87	1,95	2,05	2,13
5	2,03	2.13	2,23	2,33	2,45	2,55	2,67
6	2,43	2.55	2,68	2,82	2,93	3,07	3,20
7	2,85	2.98	3,13	3,28	3,43	3,58	3,75
8	3,25	3.42	3,58	3,75	3,93	4,10	4,28
9	3,67	3.85	4,05	4,23	4,43	4,63	4,83
10	4,08	4.30	4,50	4,72	4,93	5,15	5,38
11	4,50	4.73	4,97	5,20	5,45	5,68	5,93
12	4,93	5.18	5,43	5,68	5,95	6,22	6,48
13	5,35	5.63	5,90	6,18	6,47	6,75	7,05
14	5,78	6.08	6,37	6,68	6,98	7,30	7,62
15	6,22	6.53	6,85	7,18	7,53	7,85	8,18
16	6,65	6.98	7,33	7,68	8,05	8,40	8,77
17	7,10	7.45	7,82	8,20	8,58	8,97	9,35
18	7,55	7.93	8,32	8,72	9,12	9,53	9,85
19	8,00	8.40	8,82	9,23	9,67	10,10	10,55
20	8,45	8.88	9,32	9,77	10,23	10,68	11,15
21	8,92	9.38	9,83	10,32	10,78	11,28	11,77
22	9,40	9.88	10,37	10,87	11,37	11,88	12,40
23	9,88	10.38	10,90	11,42	11,95	12,48	13,05
24	10,37	10.90	11,43	11,98	12,55	13,12	13,70
25	10,87	11.42	11,98	12,57	13,15	13,80	14,35
26	11,37	11.95	12,55	13,15	14,77	14,38	15,03
27	11,88	12.48	13,12	13,73	14,38	15,05	15,72
28	12,40	13.05	13,70	14,35	15,03	15,72	16,42
29	12,93	13.62	14,28	14,48	15,68	16,40	17,13
30	13,48	14.18	14,90	15,62	16.35	17,12	17,88
31	14,05	14.78	15,52	16,27	17,03	17,83	18,63
32	14,62	15.38	16,15	16,93	17,75	18,57	19,40

Degrees of Declination.

A Table of Ascensional Differences.

Degrees of Declination. Poles.	29	30	31	32	33	34	35
1	00, 53	00, 58	00, 60	00, 62	00, 65	00, 67	00, 70
2	1, 12	1, 15	1, 20	1, 25	1, 30	1, 35	1, 40
3	1, 67	1, 73	1, 80	1, 88	1, 95	2, 03	2, 10
4	2, 22	2, 32	2, 40	2, 50	2, 60	2, 70	2, 80
5	2, 78	2, 90	3, 01	3, 13	3, 25	3, 38	3, 52
6	3, 33	3, 48	3, 62	3, 77	3, 92	4, 07	4, 22
7	3, 90	4, 07	4, 23	4, 40	4, 57	4, 75	4, 93
8	4, 47	4, 65	4, 85	5, 03	5, 23	5, 43	5, 65
9	5, 03	5, 25	5, 47	5, 68	5, 90	6, 13	6, 37
10	5, 62	5, 85	6, 08	6, 33	6, 58	6, 83	7, 10
11	6, 18	6, 45	6, 70	6, 98	7, 25	7, 53	7, 82
12	6, 77	7, 05	7, 33	7, 63	7, 93	8, 25	8, 57
13	7, 35	7, 67	7, 97	8, 30	8, 62	8, 97	9, 30
14	7, 93	8, 28	8, 62	8, 97	9, 32	9, 68	10, 05
15	8, 53	8, 90	9, 27	9, 63	10, 02	10, 42	10, 82
16	9, 13	9, 53	9, 92	10, 32	10, 73	11, 15	11, 58
17	9, 75	10, 17	10, 58	11, 02	11, 45	11, 90	12, 37
18	10, 38	10, 82	11, 27	11, 72	12, 18	12, 67	13, 15
19	11, 00	11, 47	11, 93	12, 42	12, 92	13, 43	13, 85
20	11, 63	12, 13	12, 63	13, 15	13, 67	14, 22	14, 77
21	12, 28	12, 80	13, 33	13, 88	14, 43	15, 00	15, 65
22	12, 93	13, 48	14, 05	14, 62	15, 22	15, 82	16, 45
23	13, 62	14, 18	14, 78	15, 38	16, 00	16, 63	17, 28
24	14, 28	14, 90	15, 52	16, 15	16, 80	17, 48	18, 17
25	14, 98	15, 62	16, 27	16, 93	17, 63	18, 33	19, 05
26	15, 68	16, 35	17, 03	17, 75	18, 47	19, 20	19, 97
27	16, 40	17, 10	17, 83	18, 57	19, 32	20, 10	20, 90
28	17, 13	17, 88	18, 63	19, 40	20, 20	21, 01	21, 85
29	17, 90	18, 67	19, 45	20, 27	21, 10	21, 95	22, 83
30	18, 67	19, 47	20, 30	21, 15	22, 02	22, 92	23, 85
31	19, 45	20, 30	21, 17	22, 05	22, 97	23, 92	24, 88
32	20, 27	21, 15	22, 05	23, 98	23, 93	24, 93	25, 95

A Table of Ascensional Differences.

Degrees of Declination.	Height. 36	37	38	39	40	41	42
1	00,73	00,75	00,78	00,82	00,83	00,87	00,90
2	1,45	1,53	1,57	1,62	1,68	1,73	1,80
3	2,18	2,27	2,35	2,43	2,52	2,62	2,70
4	2,92	3,01	3,13	3,25	3,37	3,48	3,62
5	3,65	3,78	3,92	4,07	4,22	4,37	4,52
6	4,38	4,55	4,72	4,87	5,07	5,25	5,43
7	5,12	5,32	5,50	5,70	5,92	6,13	6,35
8	5,87	6,08	6,30	6,53	6,77	7,02	7,27
9	6,60	6,85	7,10	7,47	7,63	7,88	8,20
10	7,37	7,63	7,92	8,22	8,50	8,82	9,13
11	8,12	8,42	8,73	9,05	9,38	9,73	10,08
12	8,88	9,22	9,57	9,92	10,27	10,65	11,03
13	9,65	10,02	10,40	10,77	11,17	11,58	12,00
14	10,43	10,83	11,23	11,65	12,08	12,53	12,97
15	11,23	11,65	12,08	12,53	13,00	13,47	13,97
16	12,03	12,48	12,95	13,43	13,92	14,43	14,97
17	12,83	13,32	13,82	14,33	14,87	15,42	15,98
18	13,65	14,17	14,70	15,25	15,82	16,40	17,01
19	14,48	15,03	15,60	16,18	16,80	17,42	18,07
20	15,33	15,92	16,32	17,13	17,78	18,45	19,13
21	16,18	16,82	17,45	18,12	18,78	19,50	20,22
22	17,08	17,73	18,40	19,10	19,82	20,57	21,33
23	17,97	18,65	19,37	20,10	20,87	21,65	22,47
24	18,87	19,60	20,35	21,13	21,93	22,77	23,63
25	19,80	20,57	21,35	22,18	23,03	23,92	24,83
26	20,75	21,57	22,40	23,27	24,17	25,08	26,05
27	21,73	22,58	23,47	24,37	25,32	26,28	27,30
28	22,72	23,61	24,55	25,50	26,50	27,52	28,60
29	23,75	24,68	25,67	26,67	27,72	28,80	29,95
30	24,80	25,78	26,82	27,87	28,98	30,12	31,32
31	25,86	26,92	28,00	29,12	30,28	31,48	32,75
32	27,00	28,08	29,22	30,90	31,52	32,90	34,23

A Table of Ascensional Differences.

Degrees of Declination.	Poles.	43	44	45	46	47	48	49
	1	00,93	00,97	01,00	01,03	01,07	01,12	01,15
	2	1,87	1,93	2,00	2,07	2,15	2,22	2,30
	3	2,80	2,90	3,00	3,12	3,22	3,33	3,45
	4	3,73	3,87	4,01	4,15	4,30	4,45	4,62
	5	4,68	4,85	5,02	5,20	5,38	5,58	5,78
	6	5,62	5,83	6,03	6,25	6,47	6,70	6,95
	7	6,57	6,82	7,05	7,30	7,57	7,83	8,12
	8	7,53	7,80	8,08	8,37	8,67	8,98	9,30
	9	8,50	8,80	9,12	9,43	9,78	10,13	10,50
	10	9,47	9,80	10,15	10,53	10,90	11,30	11,70
	11	10,45	10,82	11,22	11,62	12,03	12,47	12,92
	12	11,43	11,85	12,27	12,72	13,18	13,65	14,15
	13	12,43	12,88	13,35	13,83	14,33	14,85	15,40
	14	13,45	13,93	14,43	14,97	15,50	16,08	16,67
	15	14,47	15,00	15,53	16,12	16,70	17,32	17,95
	16	15,51	16,08	16,67	17,27	17,90	18,57	19,27
	17	16,57	17,17	17,80	18,45	19,13	19,85	20,60
	18	17,63	18,28	18,97	19,67	20,38	21,15	21,95
	19	18,73	19,42	20,15	20,88	21,67	22,48	23,33
	20	19,83	20,58	21,35	22,13	22,97	23,85	24,75
	21	20,98	21,77	22,57	23,42	24,30	25,23	26,20
	22	22,13	22,97	23,83	24,73	25,67	26,67	27,70
	23	23,32	24,20	24,12	26,08	27,08	28,13	29,23
	24	24,53	25,47	26,43	27,45	28,52	29,63	30,80
	25	25,78	26,77	27,80	28,87	30,00	31,20	32,43
	26	27,03	28,10	29,18	30,33	31,53	32,80	34,13
	27	28,37	29,48	30,63	31,85	33 12	34,47	35,88
	28	29,73	30,90	32,12	33,42	34,77	36,20	37,70
	29	31,13	32,37	33,67	35,03	36,47	38,00	39,62
	30	32,58	33,88	35,27	36,72	38,25	39,88	41,62
	31	33,97	35,47	36,93	38,48	40,12	41,87	43,73
	32	35,63	37,12	38,67	40,32	42,07	43,95	45,95

A Table of Ascensional Differences.

Height.	50	51	52	53	54	55	56
1	01. 20	01. 23	01, 28	01, 33	01. 38	01, 43	01, 48
2	2. 38	2. 47	2, 57	3, 05	3, 15	3, 27	3, 37
3	3. 58	4. 12	4, 25	4, 38	4, 53	5, 08	5, 25
4	5. 18	5. 35	5, 53	6, 12	6, 32	6, 52	7, 13
5	6. 38	6. 58	7, 21	7, 45	8, 10	8, 36	9, 03
6	7. 58	8. 22	8, 49	9, 18	9, 48	10, 20	10, 53
7	9. 18	9. 46	10, 17	10, 50	11, 25	12, 02	12, 41
8	10. 38	11. 10	11, 45	12, 23	13, 03	13, 45	14, 30
9	11. 58	12. 34	13, 13	13, 55	14, 40	15, 28	16, 18
10	13. 18	13. 58	14, 41	15, 28	16, 18	17, 11	18, 07
11	14. 40	15. 22	16, 09	17, 01	17, 56	18, 55	19, 57
12	16. 02	16. 46	17, 37	18, 34	19, 34	20, 39	21, 47
13	17. 23	18. 10	19, 05	20, 07	21, 13	22, 24	23, 38
14	18. 45	19. 34	20, 33	21, 40	22, 52	24, 08	25, 29
15	20. 07	20. 58	22, 02	23, 13	24, 31	25, 53	27, 20
16	21. 28	22. 22	23, 30	24, 46	26, 10	27, 37	29, 11
17	22. 50	23. 46	24, 58	26, 19	27, 49	29, 22	31, 02
18	24. 12	25. 10	26, 27	27, 52	29, 28	31, 07	32, 53
19	25. 33	26. 34	27, 55	29, 25	31, 07	32, 52	34, 44
20	26. 55	27. 58	29, 24	30, 58	32, 46	34, 36	36, 35
21	28. 17	29. 22	30, 52	32, 31	34, 25	36, 21	38, 26
22	29. 38	30. 46	32, 21	34, 04	36, 04	38, 06	40, 17
23	31. 00	32. 10	33, 49	35, 37	37, 43	39, 51	42, 08
24	32. 22	33. 34	35, 18	37, 10	39, 22	41, 36	43, 59
25	33. 44	34. 58	36, 46	38, 43	41, 01	43, 21	45, 50
26	35. 06	36. 22	38, 15	40, 16	42, 40	45, 06	47, 41
27	36. 28	37. 46	39, 43	41, 49	44, 19	46, 51	49, 32
28	37. 50	39. 10	41, 12	43, 22	45, 58	48, 36	51, 23
29	39. 12	40. 34	42, 40	44, 55	47, 37	50, 21	53, 14
30	40. 34	41. 58	44, 09	46, 28	49, 16	52, 06	55, 05
31	41. 56	43. 22	45, 37	48, 01	50, 55	53, 51	56, 56
32	43. 18	44. 46	47, 06	49, 34	52, 34	55, 36	58, 47
33	44. 40	46. 10	48, 34	51, 07	54, 13	57, 21	60, 38
34	46. 02	47. 34	50, 03	52, 40	55, 52	59, 06	62, 29
35	47. 24	48. 58	51, 31	54, 13	57, 31	60, 51	64, 20
36	48. 46	50. 22	53, 00	55, 46	59, 10	62, 36	66, 11

Degrees of Declination.

A Table of oblique Ascensions.

S.	D.	1	2	3	4	5	6
♈	0	000,00	000,00	000,00	000,00	000,00	000,00
	4	3,63	3,60	3,58	3,55	3,53	3,48
	8	7,28	7,23	7,17	7,12	7,07	7,00
	12	10,95	10,87	10,77	10,68	10,60	10,53
	16	14,62	14,50	14,38	14,28	14,17	14,07
	20	18,32	18,17	18,03	17,90	17,77	17,62
	24	22,05	21,87	21,70	21,55	21,38	21,22
	28	25,80	25,62	25,42	25,25	25,05	24,83
♉	2	29,60	29,38	29,17	28,95	28,73	28,50
	6	33,43	33,18	32,95	32,72	32,45	32,22
	10	37,32	37,05	36,78	36,52	36,25	35,98
	14	41,23	40,95	40,65	40,37	40,08	39,78
	18	45,22	44,90	44,60	44,28	43,98	43,67
	22	49,25	48,90	48,58	48,25	47,92	47,58
	26	53,30	52,95	52,62	52,27	51,90	51,55
♊	0	57,43	57,07	56,70	56,33	55,95	55,58
	4	61,62	61,22	60,83	60,47	60,07	59,68
	8	65,83	65,42	65,03	64,63	64,22	63,83
	12	70,08	69,67	69,27	68,85	68,43	68,03
	16	74,37	73,95	73,53	73,12	72,68	72,27
	20	78,68	78,27	77,83	77,40	76,98	76,55
	24	83,02	82,60	82,17	81,73	81,30	80,87
	28	87,38	86,95	86,52	86,07	85,63	85,20
♋	2	91,75	91,32	90,88	90,45	90,03	89,58
	6	96,12	95,68	95,25	94,80	94,38	93,95
	10	100,45	100,03	99,60	99,17	98,75	98,32
	14	104,78	104,37	103,95	103,53	103,10	101,68
	18	109,10	108,68	108,28	107,87	107,45	107,05
	22	113,38	112,97	112,58	112,18	111,78	111,38
	26	117,63	117,22	116,85	116,47	116,08	115,70
	30	121,83	121,47	121,10	120,73	120,35	119,98

A Table of oblique Ascensions.

S. D	1	2	3	4	5	6
♌ 0	121,83	121,47	121.10	120,73	120,35	119,98
4	125,98	125,63	125.30	124,93	124,58	124,23
8	130,10	129,75	129.43	129,10	128,77	128,43
12	134,17	133,85	133.53	133,23	132,92	132,60
16	138,18	137,90	137.61	137,32	137,03	136,75
20	142,15	141,88	141.62	141,35	141,08	140,82
24	146,08	145,85	145.62	145,37	145,12	144,85
28	149,97	149,77	149.53	149,32	149,10	148,87
♍ 2	153,82	153,63	153.43	153,25	153,05	152,85
6	157,63	157,47	157.30	157,13	156,93	156,80
10	161,42	161,27	161.13	161,00	160,87	160,72
14	165,17	165,07	164.93	164,83	164,73	164,62
18	168,90	168,82	168.72	168,63	168,57	168,48
22	172,62	172,55	172.50	172,43	172,38	172,33
26	176,32	176,28	176.27	176,23	176,20	176,17
♎ 0	180,00	180,00	180.00	180,00	180,00	180,00
4	183,68	183,72	183.73	183,77	183,80	183,83
8	187,38	187,45	187.50	187,57	187,62	187,67
12	191,10	191,18	191.28	191,37	191,43	191,52
16	194,83	194,93	195.07	195,17	195,27	195,38
20	198,58	198,73	198.87	199,00	199,13	199,28
24	202,37	202,53	202.70	202,87	203,02	203,20
28	206,18	206.37	206.57	206,75	206,95	207,15
♏ 2	210,03	210.23	210.47	210,68	210,90	211,13
6	213,92	214.15	214.38	214,63	214,88	215,15
10	217,85	218.12	218.38	218,58	218,92	219,18
14	221,82	222.10	222.38	222,53	222,97	223,25
18	225,83	226.15	226.47	226,38	227,08	227,40
22	229,90	230.25	230.57	230,90	231,23	231,57
26	234,02	234.37	234.70	235,07	235,42	235,77
30	238,17	238.53	238.90	239,27	239,65	240,02

A Table of oblique Ascensions.

S.	D.	1	2	3	4	5	6
♑	0	238,17	238,53	238,90	239,27	239,65	240.02
	4	242,37	242,77	243,15	243,53	243,92	244.30
	8	246,62	247,03	247,42	247,82	248,22	248.62
	12	250,90	251,32	251,72	252,13	252,55	252.95
	16	255,22	255,63	256,05	256,47	256,90	257.32
	20	259,55	259,97	260,40	260,83	261,25	261.68
	24	263,88	264,32	264,75	265,20	265,62	266.05
	28	268,25	268,68	269,12	269,55	269,97	270.42
♈	2	272,62	273,05	273,48	273,93	274,37	274.80
	6	276,98	277,40	277,83	278,27	278,70	279.13
	10	281,32	281,73	282,17	282,60	283,02	283.45
	14	285,63	286,05	286,47	286,88	287,32	287.73
	18	289,92	290,33	290,73	291,15	291,57	291.97
	22	294,17	294,58	294,97	295,37	295,78	296.17
	26	298,38	298,78	299,17	299,53	299,93	300.32
♉	0	302,57	302,93	303,30	303,67	304,05	304.41
	4	306,70	307,05	307,38	307,73	308,10	308.45
	8	310,75	311,10	311,42	311,75	312,08	312.42
	12	314,78	315,10	315,40	315,72	316,02	316.33
	16	318,77	319,05	319,35	319,63	319,92	320.22
	20	322,68	322,95	323,22	323,48	323,75	324.02
	24	326,57	326,82	327,05	327,28	327,55	327.78
	28	330,40	330,62	330,83	331,05	331,27	331.50
♊	2	334,20	334,38	334,58	334,77	334,95	335.17
	6	337,95	338,13	338,30	338,45	338,62	338.78
	10	341,68	341,83	341,97	342,10	342,23	342.38
	14	345,38	345,50	345,62	345,72	345,83	345.93
	18	349,05	349,13	349,23	349,32	349,40	349.47
	22	352,72	352,77	352,83	352,88	352,93	353.00
	26	356,37	356,40	356,42	356,45	356,47	356.52
	30	360,00	360,00	360,00	360,00	360,00	360.00

A Table of oblique Ascensions.

S.	D.	7	8	9	10	11	12
♈	0	000,00	000,00	000,00	000,00	000,00	000,00
	4	03,47	03,43	03,40	03,38	03,35	03,33
	8	06,95	06,88	06,83	06,78	06,72	06,67
	12	10,43	10,35	10,27	10,18	10,10	10,00
	16	13,95	13,83	13,72	13,60	13,50	13,37
	20	17,48	17,33	17,20	17,05	16,92	16,77
	24	21,05	20,87	20,72	20,53	20,38	20,20
	28	24,65	24,47	24,27	24,07	23,87	23,67
♉	2	28,30	28,07	27,85	27,63	27,40	27,18
	6	31,98	31,72	31,48	31,23	30,82	30,73
	10	35,72	35,45	35,18	34,90	34,63	34,35
	14	39,50	39,20	38,92	38,62	38,32	38,02
	18	43,35	43,03	42,72	42,40	42,08	41,75
	22	47,25	46,92	46,57	46,23	45,90	45,53
	26	51,20	50,83	50,48	50,13	49,77	49,38
♊	0	55,20	54,83	54,47	54,08	53,70	53,32
	4	59,28	58,90	58,52	58,12	57,72	57,32
	8	63,42	63,03	62,62	62,20	61,80	61,37
	12	67,60	67,20	66,78	66,35	65,93	65,50
	16	71,85	71,42	70,98	70,53	70,12	69,68
	20	76,12	75,68	75,22	74,80	74,35	73,92
	24	80,42	79,98	79,53	79,08	78,63	78,18
	28	84,75	84,32	83,87	83,42	82,97	82,52
♋	2	89,12	88,68	88,23	87,78	87,33	86,88
	6	93,48	93,05	92,60	92,17	91,72	91,27
	10	97,88	97,45	97,00	96,57	96,12	95,68
	14	102,27	101,83	101,40	100,95	100,52	100,10
	18	106,63	106,22	105,80	105,37	104,95	104,52
	22	110,97	110,58	110,17	109,77	109,35	108,92
	26	115,30	114,92	114,53	114,13	113,73	113,32
	30	119,60	119,23	118,87	118,48	118,10	117,72

A Table of oblique Ascensions.

S.	D.	7	8	9	10	11	12
♌	0	119,60	119,23	118,87	118,48	118,10	117,72
	4	123,87	123,52	123,17	122,80	122,43	122,07
	8	128,10	127,77	127,42	127,07	126,75	126,38
	12	132,30	131,97	131,65	131,33	131,02	130,68
	16	136,45	136,15	135,87	135,57	135,27	134,97
	20	140,55	140,28	140,02	139,75	139,47	139,18
	24	144,63	144,38	144,15	143,90	143,65	143,38
	28	148,67	148,45	148,22	148,02	147,78	147,55
♍	2	152,67	152,47	152,28	152,08	151,88	151,68
	6	156,65	156,47	156,30	156,13	155,97	155,80
	10	160,58	160,43	160,30	160,15	160,02	159,87
	14	164,50	164,38	164,27	164,15	164,05	163,93
	18	168,40	168,30	168,22	168,13	168,05	167,97
	22	172,27	172,22	172,15	172,10	172,05	171,98
	26	176,13	176,12	176,08	176,07	176,03	176,00
♎	0	180,00	180,00	180,00	180,00	180,00	180,00
	4	183,87	183,88	183,92	183,93	183,97	184,00
	8	187,73	187,78	187,85	187,90	187,95	188,02
	12	191,60	191,70	191,78	191,87	191,95	192,03
	16	195,50	195,62	195,73	195,85	195,95	196,07
	20	199,42	199,57	199,70	199,85	199,98	200,13
	24	200,35	203,53	203,70	203,87	204,03	204,20
	28	207,33	207,53	207,72	207,92	208,12	208,32
♏	2	211,33	211,55	211,78	211,98	212,22	212,45
	6	215,37	215,62	215,85	216,10	216,35	216,62
	10	219,45	219,72	219,98	220,25	220,53	220,82
	14	223,55	223,85	224,13	224,43	224,73	225,03
	18	227,70	228,03	228,35	228,67	228,98	229,32
	22	231,90	232,23	232,58	232,93	233,25	233,62
	26	236,13	236,48	236,83	237,20	237,57	237,93
	30	240,40	240,77	241,13	241,52	242,90	242,28

A Table of oblique Ascensions.

S.	D.	7	8	9	10	11	12
♈	0	240,40	240,77	241,13	241.52	241.90	247.28
	4	244,70	245,08	245,47	245.87	246.27	246.68
	8	249,03	249,42	249,83	250.23	250.65	251.08
	12	253,37	253,78	254,20	254.63	255.05	255.48
	16	257,73	258,17	258,60	259.05	259.48	259.90
	20	262,12	262,55	263,00	263.43	263.88	264.32
	24	266,52	266,95	267,40	267.83	268.28	268.73
	28	270,88	271,32	271,77	272.22	272.67	273.12
♉	2	275,25	275,68	276,13	276.58	277.03	277.48
	6	279,58	280,02	280,47	280.92	281.37	281.82
	10	283,88	284,32	284,78	285.20	285.65	286,08
	14	288,15	288,58	289,02	289.47	289.88	290,32
	18	292,40	292,80	293,22	293,65	294.07	294.50
	22	296,58	296,97	297,38	297.80	298.20	298,63
	26	300,72	301,10	301,48	301.88	302.28	302.68
♊	0	304,80	305,17	305,53	305,92	306,30	306.68
	4	308,80	309,17	309,52	309,88	310.23	313.62
	8	312,75	313,08	313,43	313.77	314.10	314.47
	12	316,65	316,97	317,28	317.60	317.92	318,25
	16	320,50	320,80	321,08	321.38	321.68	321.98
	20	324,28	324,55	324,82	325.10	325.37	325.65
	24	328,02	328,28	328,52	328.77	329.18	329.27
	28	331,70	331,93	332,15	332.37	332.60	332.82
♋	2	335,38	335,53	335,73	335,93	336,13	336.33
	6	338,95	339,13	339,28	339.47	339.62	339.80
	10	342,52	342,67	342,80	342,95	343.08	343.23
	14	346,05	346,17	346,28	346.40	346.50	346.63
	18	349,57	349,65	349,73	349.82	349.90	350.00
	22	353,05	353,12	353,13	353.22	353.28	353.33
	26	356,53	356,57	356,60	356.62	356.65	356.67
	30	360,00	360,00	360,00	360,00	360.00	360.00

A Table of oblique Ascensions.

S.	D.	13	14	15	16	17	18
♈	0	000,00	000,00	000,00	000,00	000,00	000,00
	4	03,28	03,27	03,23	03,20	03,17	03,13
	8	06,60	06,55	06,48	06,43	06,37	06,30
	12	09,93	09,83	09,75	09,67	09,57	09,47
	16	13,27	13,15	13,02	12,92	12,78	12,67
	20	16,63	16,48	16,33	16,18	16,03	15,88
	24	20,03	19,85	19,67	19,50	19,32	19,15
	28	23,47	23,27	23,07	22,85	22,65	22,45
♉	2	26,95	26,72	26,48	26,25	26,03	25,78
	6	30,47	30,22	29,97	29,70	29,45	29,17
	10	34,07	33,80	33,52	33,22	32,93	32,63
	14	37,72	37,40	37,10	36,78	36,47	36,15
	18	41,43	41,10	40,77	40,43	40,08	39,73
	22	45,20	44,83	44,48	44,13	43,77	43,40
	26	49,02	48,65	48,28	47,90	47,52	47,12
♊	0	52,92	52,53	52,15	51,75	51,33	50,93
	4	56,92	56,50	56,08	55,68	55,25	54,83
	8	60,97	60,53	60,10	59,67	59,25	58,80
	12	65,07	64,63	64,20	63,75	63,28	62,83
	16	69,23	68,80	68,35	67,88	67,92	66,95
	20	73,47	73,00	72,55	72,08	71,62	71,15
	24	77,73	77,27	76,82	76,35	75,88	75,40
	28	82,07	81,60	81,13	80,67	80,20	79,72
♋	2	86,42	85,95	85,50	85,02	84,55	84,07
	6	90,82	90,35	89,90	89,42	88,95	88,47
	10	95,23	94,77	94,32	93,85	93,38	92,92
	14	99,65	99,20	98,77	98,30	97,83	97,37
	18	104,08	103,65	103,22	102,77	102,30	101,87
	22	108,52	108,08	107,67	107,23	106,80	106,35
	26	112,92	112,52	112,10	111,68	111,27	110,85
	30	117,32	116,93	116,55	116,15	115,73	115,33

A Table of oblique Ascensions.

S.	D.	13	14	15	16	17	18
♌	0	117,32	116,93	116,55	116,15	115,73	115,33
	4	121,70	121,33	120,95	120,58	120,20	119,80
	8	126,03	125,70	125,33	124,98	124,62	124,25
	12	130,37	130,03	129,70	129,37	129,03	128,68
	16	134,67	134,37	134,05	133,73	133,43	133,10
	20	138,90	138,63	138,35	138,05	137,77	137,47
	24	143,13	142,88	142,62	142,37	142,10	141,83
	28	147,32	147,08	146,87	146,63	146,40	146,17
♍	2	151,48	151,28	151,07	150,87	150,67	150,47
	6	155,62	155,45	155,27	155,10	154,92	154,73
	10	159,73	159,58	159,43	159,28	159,13	158,98
	14	163,82	163,70	163,57	163,47	163,33	163,22
	18	167,88	167,80	167,70	167,62	167,52	167,42
	22	171,93	171,87	171,82	171,75	171,68	171,62
	26	175,97	175,93	175,92	175,88	175,85	175,82
♎	0	180,00	180,00	180,00	180,00	180,00	180,00
	4	184,03	184,07	184,08	184,12	184,15	184,18
	8	188,07	188,13	188,18	188,25	188,32	188,38
	12	192,12	192,20	192,30	192,38	192,48	192,58
	16	196,18	196,30	196,43	196,53	196,67	196,78
	20	200,27	200,42	200,57	200,72	200,87	201,02
	24	204,38	204,55	204,73	204,90	205,08	205,27
	28	208,52	208,72	208,93	209,13	209,33	209,53
♏	2	212,68	212,92	213,13	213,37	213,60	213,83
	6	216,87	217,12	217,38	217,63	217,90	218,17
	10	221,10	221,37	221,65	221,95	222,23	222,53
	14	225,33	225,63	225,95	226,27	226,57	226,90
	18	229,63	229,97	230,30	230,63	230,97	231,32
	22	233,97	234,39	234,67	235,02	235,38	235,75
	26	238,30	238,67	239,05	239,42	239,80	240,20
	30	242,68	243,07	243,45	243,85	244,27	244,67

A Table of oblique Ascensions.

S.	D.	13	14	15	16	17	18
♐	0	242,68	243,07	243,45	243,85	244,27	244,67
	4	247,08	247,48	247,90	248,32	248,73	249,19
	8	251,48	251,92	252,33	252,77	253,20	253,65
	12	255,92	256,35	256,78	257,27	257,70	258,13
	16	260,35	260,80	261,23	261,70	262,17	262,63
	20	264,77	265,23	265,68	266,15	266,62	267,08
	24	269,18	269,65	270,10	270,58	271,05	271,53
	28	273,53	274,05	274,50	274,98	275,45	275,93
♑	2	277,93	278,40	278,87	279,33	279,80	280,28
	6	282,27	282,73	283,18	283,65	284,12	284,60
	10	286,53	287,00	287,45	287,92	288,38	288,85
	14	290,77	291,20	291,65	292,12	292,58	293,05
	18	294,93	295,37	295,80	296,25	296,72	297,17
	22	299,03	299,47	299,90	300,33	300,75	301,20
	26	303,08	303,50	303,92	304,32	304,75	305,17
♒	0	307,08	307,47	307,85	308,25	308,67	309,07
	4	310,98	311,35	311,72	312,10	312,48	312,88
	8	314,80	315,17	315,52	315,87	316,23	316,60
	12	318,57	318,90	319,23	319,57	319,92	320,27
	16	322,38	322,60	322,90	323,22	323,53	323,15
	20	325,93	326,20	326,48	326,78	327,07	327,37
	24	329,53	329,78	330,03	330,30	330,55	330,83
	28	333,05	333,28	333,52	333,75	333,97	334,22
♓	2	336,53	336,73	336,93	337,15	337,35	337,55
	6	339,97	340,15	340,33	340,50	340,68	340,85
	10	343,37	343,52	343,67	343,82	343,97	344,12
	14	346,73	346,85	346,98	347,08	347,22	347,33
	18	350,07	350,17	350,25	350,33	350,43	350,53
	22	353,40	353,45	353,52	353,57	353,63	353,70
	26	356,72	356,73	356,77	356,80	356,83	356,87
	30	360,00	360,00	360,00	360,00	360,00	360,00

A Table of oblique Ascensions.

S.	D.	19	20	21	22	23	24
♈	0	000,00	000,00	000.00	000,00	000,00	000,00
	4	03,12	03,08	03.05	03,02	02,98	02,95
	8	06,25	06,18	06.12	06,05	05,98	05,92
	12	09,38	09,28	09.18	09,10	09,00	08,90
	16	12,53	12,42	12.28	12,17	12,03	11,90
	20	15,73	15,58	15.42	15,27	15,10	14,93
	24	18,97	18,78	18.58	18,40	18,20	18,00
	28	22,23	22,02	21.80	21,58	21,35	21,13
♉	2	25,38	25,30	25.05	24,80	24,55	24,30
	6	28,92	28,65	28.35	28,08	27,80	27,52
	10	32,35	32,05	31.75	31,43	31,12	30,80
	14	35,83	35,52	35.17	34,83	34,50	34,15
	18	39,40	39,05	38.68	38,33	37,95	37,60
	22	43,03	42,67	42.28	41,90	41,50	41,10
	26	46,73	46,33	45.93	45,53	45,12	44,68
♊	0	50,52	50,10	49.68	49,25	48,82	48,37
	4	54,40	53,97	53.53	53,07	52,63	52,15
	8	58,35	57,90	57.45	56,97	56,50	56,02
	12	62,38	61,92	61.45	60,97	60,47	59,98
	16	66,48	66,03	65.53	65,05	64,53	64,02
	20	70,67	70,18	69.68	69,18	68,67	68,15
	24	74,92	74,42	73.92	73,42	72,90	72,38
	28	79,22	78,73	78.22	77,70	77,20	76,67
♋	2	83,58	83,08	82.58	82,07	81,57	81,03
	6	87,98	87,48	86.98	86,48	85,97	85,45
	10	92,43	91,95	91.45	90,95	90,33	89,92
	14	96,90	96,42	95.93	95,48	94,95	94,47
	18	101,40	100,92	100.47	99,98	99,48	98,98
	22	105,92	105,43	105.00	104,52	104,05	103,57
	26	110,42	109,97	109.53	109,08	108,63	108,17
	30	114,92	114,50	114.08	113,65	113,50	112,77

A Table of oblique Ascensions.

S. D	19	20	21	22	23	24
♌ 0	114,92	114,50	114.08	113,65	113,50	112,77
4	119,42	119,02	118.62	118,20	117,80	117,37
8	123,88	123,51	123.13	122,73	122,35	121.95
12	128,33	128,00	127.63	127,27	126,90	126,53
16	132,78	132,47	132.12	131,80	131,45	131.10
20	137,18	136,88	136.57	136,27	135,95	135,63
24	141,58	141,30	141.01	140,73	140,47	140,17
28	145,92	145,85	145.42	145,18	144,93	144,67
♍ 2	150,25	150,03	149.82	149,58	149,37	149,13
6	154,57	154,37	154.18	153,98	153,80	153,60
10	158,83	158,68	158.52	158,53	158,20	158,03
14	163,10	162,97	162.85	162,72	162,60	162,45
18	167,33	167,23	167.15	167,05	166,97	166,85
22	171,57	171,50	171.43	171,38	171,32	171,25
26	175,80	175,77	175.73	175,70	175,67	175,63
♎ 0	180,00	180,00	180.00	180,00	180,00	180,00
4	184,20	184,23	184.27	184,30	184,33	184,37
8	188,43	188,50	188.57	188,62	188,68	188,75
12	192,67	192,77	192.85	192,95	193,03	193,15
16	196,90	197,03	197.15	197,28	197,40	197,55
20	201,17	201,32	201.48	201,47	201,80	201,97
24	205,43	205,63	205.82	206,02	206,20	206,40
28	209,75	209,97	210.18	210,42	210,63	210,87
♏ 2	214,08	214,15	214.58	214,82	215,07	215,33
6	218,42	218.70	218.99	219,27	219,53	219,83
10	222,82	223.12	223.43	223,73	224,05	224,37
14	227,22	227.53	227.88	228,20	228,55	228,90
18	231,67	232,00	232.37	232,73	233,10	233,47
22	236,12	236,49	236.87	237,27	237,65	238,05
26	240,58	240,98	241.38	241,80	242,20	242,63
30	245,08	245,50	245.92	246,35	246,50	247,23

A Table of Oblique Ascensions.

S. D.	19	20	21	22	23	24
♐ 0	245,08	245,50	245,92	246.35	246,50	247,23
4	249,58	250,03	250,47	250.92	251,37	251,83
8	254,08	254,57	255,00	255.48	255,95	256,43
12	258,60	259,08	259,53	260.02	260,52	261,02
16	263,10	263,58	264,07	264.52	265,05	265,53
20	267,57	268,05	268,55	269.05	269,67	270,08
24	271,02	272,52	273,02	273.52	274,03	274,55
28	276,42	276,92	277,42	277.93	278,43	278,97
♑ 2	280,78	281,27	281,78	282.20	282,80	283,33
6	285,08	285,58	286,08	286.58	287,10	287,62
10	289,33	289,82	290,32	290.82	291,33	291,85
14	293,52	293,97	294,47	294.95	295,47	295,98
18	297,62	298 08	298,55	299.03	299,53	300,02
22	301,65	302,10	302,55	303.03	303,50	303,98
26	305,60	306,03	306,47	306.93	307,33	307,85
♒ 0	309,48	309,90	310,32	310.75	311,18	311,63
4	313,27	313,67	314,07	314.47	314,88	315,32
8	316,97	317,33	317,72	318.10	318,50	318,90
12	320,60	320,95	321,32	321.67	322,05	322,40
16	324,17	324,48	324,83	325.17	325,50	325,85
20	327,65	327,95	328,27	328.57	328,88	329,20
24	331,08	331,35	331,65	331.92	332,20	332,48
28	334,62	334,70	334,95	335.20	335,45	335,70
♓ 2	337,77	337,98	338,20	338.41	338,65	338,87
6	341,03	341,22	341,42	341.60	341,80	342,00
10	344,27	344,42	344,58	344.73	344,90	345,07
14	347,47	347,58	347,72	347.83	347,97	348,10
18	350,62	350,72	350,82	350 90	351,00	351,10
22	353,75	353,81	353.88	353.95	354,02	354,08
26	356,88	356,92	356.95	356.98	357,02	357.05
30	360,00	360,00	360.00	360.00	360,00	360,00

A Table of oblique Ascensions.

S. D.	25	26	27	28	29	30
♈ 0	000,00	000,00	000,00	010,00	000,00	000,00
4	02,88	02,95	02,85	02,80	22,78	02,73
8	05,85	05,78	05,70	05,63	05,58	05,50
12	08,80	03,70	08,58	08,48	08,38	08,27
16	11,77	11,63	11,50	11,35	11,20	11,07
20	14,77	14,60	14,43	14,25	14,07	13,90
24	17,82	17,60	17,40	17,18	16,98	16,77
28	20,90	20,67	20,42	20,18	19,92	19,68
♉ 2	24,01	23,77	23,48	23,22	22,92	22,65
6	27,22	26,92	26,62	26,30	26,00	25,67
10	30,48	30,15	29,82	29,48	29,13	28,78
14	33,82	33,45	33,07	32,72	32,32	31,95
18	37,22	36,83	36,43	36,03	35,62	35,22
22	40,70	40,28	39,88	39,45	39,00	38,57
26	44,25	43,83	43,37	42,93	42,47	42,00
♊ 0	47,90	47,47	47,00	46,32	46,03	45,53
4	51,68	51,20	50,72	50,22	49,72	49,20
8	55,53	55,02	54,53	54,00	53,48	52,95
12	59,48	58,97	58,43	57,90	57,35	56,82
16	63,52	62,98	62,45	61,92	61,33	60,78
20	67,63	67,10	66,55	66,00	65,43	64,85
24	71,83	71,30	70,75	70,18	69,62	69,03
28	76,13	75,58	75,03	74,47	73,88	73,30
♋ 2	80,50	79,75	79,40	78,83	78,25	77,67
6	84,92	84,38	83,83	83,27	82,68	82,10
10	89,40	88,87	88,31	87,77	87,20	86,62
14	93,93	93,40	92,85	92,32	91,75	91,18
18	98,48	97,98	97,45	96,92	96,35	95,82
22	103,08	102,58	102,08	101,55	101,03	100,48
26	107,68	107,20	106,73	106,22	105,72	105,20
30	112,30	111,87	111,40	110,92	110,43	109,93

A Table of oblique Ascensions.

S. D	25	26	27	28	29	30
♌ 0	112,30	111,87	111.40	110,92	110,43	109,93
4	116,93	116,53	116.07	115,62	115,15	114,67
8	121,55	121,15	120.72	120,30	119,85	119.40
12	126,17	125,78	125.38	124,98	124,57	124,15
16	130,77	130,40	130.03	129,67	129,28	128,90
20	135,32	134,98	134.65	134,32	133,97	133.62
24	139,87	139,75	139,28	138,97	138,65	138,33
28	144,40	144,13	143.87	143,65	143,30	143,03
♍ 2	148,92	148,67	148.43	148,18	147,95	147,68
6	153,30	153,20	153.00	152,78	152,57	152,35
10	157,87	157,70	157.53	157,35	157,17	157,03
14	162,33	162,18	162.05	161,90	161,77	161,62
18	166,77	166,65	166.55	166,43	166,33	166,22
22	171,18	171,12	170.03	170,97	170,90	170,82
26	175,60	175,57	175.53	175,40	175,47	175,42
♎ 0	180,00	180,00	180.00	180,00	180,00	180,00
4	184,40	184,43	184.47	184,52	184,53	184,58
8	188,82	188,88	188.97	189,03	189,10	189,18
12	193,23	193,35	193.45	193,57	193,67	193,78
16	197,67	197,82	197.95	198,10	198,23	198,38
20	202,13	202,30	202.47	202,65	202,83	202,97
24	206,60	206,80	207.00	207,22	207,43	207,65
28	211,08	211,33	211.57	211,82	212,05	212,32
♏ 2	215,60	215,87	216.13	216,35	216,70	216,97
6	220,13	220.25	220.72	221,03	221,35	221,67
10	224,68	225.02	225.35	225,68	226,03	226,38
14	229,23	229.60	229.97	230,33	230,72	231,10
18	233,83	234,22	234.62	235,02	235,42	235,85
22	238,45	238,85	239.28	239,70	240,15	240,60
26	243,07	243,47	243.93	244,38	244,85	245,33
30	247,70	248,13	248.60	249,08	249,57	250,07

A Table of oblique Ascensions.

S. D.	25	26	27	28	29	30
♑ 0	247,70	248,13	248,60	249,08	249,57	250,07
4	252,32	252,80	253,27	253,78	254,28	254,80
8	256,92	257,42	257,92	258,45	258,97	259,52
12	261,52	262,02	262,55	263,08	263,65	264,18
16	266,07	266,60	267,15	267,68	268,25	268,82
20	270,60	271,13	271,68	272,23	272,80	273,38
24	275,08	275,62	276,17	276,73	277,32	277,90
28	279,50	280,05	280,60	281,17	281,75	282,33
♒ 2	283,87	284,42	284,97	285,53	286,12	286,70
6	288,17	288,70	289,25	289,82	290,35	290,97
10	292,37	292,90	293,45	294,00	294,57	295,15
14	296,48	297,02	297,55	298,08	298,67	299,22
18	300,52	301,03	301,57	302,10	302,65	303,18
22	304,47	304,97	305,47	306,00	306,52	307,05
26	308,32	308,80	309,28	309,78	310,28	310,80
♓ 0	312,10	312,53	313,00	313,68	313,97	313,47
4	314,75	315,17	316,63	316,07	317,53	317,00
8	319,30	319,72	320,12	320,55	321,00	321,43
12	322,78	323,17	323,57	323,97	324,38	324,78
16	326,18	326,55	326,93	327,28	327,68	328,05
20	329,52	329,85	330,18	330,52	330,87	331,22
24	332,78	333,08	333,35	333,70	334,00	334,33
28	335,99	336,23	336,52	336,78	337,08	337,35
♈ 2	339,10	339,33	339,58	339,82	340,08	340,32
6	342,18	342,40	342,60	342,82	343,02	343,23
10	345,23	345,40	345,57	345,75	345,93	346,10
14	348,23	348,37	348,50	348,65	348,80	348,93
18	351,20	351,30	351,42	351,52	351,62	351,73
22	354,15	354,22	354,28	354,37	354,42	354,50
26	357,12	357,05	357,15	357,20	357,22	357,27
30	360,00	360,00	360,00	360,00	360,00	360,00

A Table of oblique Ascensions.

S.	D.	31	32	32.18	33	34	35
♈	0	000,00	000,00	000.00	000,00	000,00	000,00
	4	02,70	02,67	02.66	02,62	02,58	02,53
	8	05,43	05,35	05.34	05,27	05,18	05,10
	12	08,17	08,05	08.03	07,93	07,80	07,68
	16	10,92	10,78	10.75	10,60	10,45	10,28
	20	13,70	13,52	13.49	13,32	13,02	12,92
	24	16,58	16,32	16.28	16,07	15,85	15,58
	28	19,42	19,17	19.12	18,87	18,62	18,32
♉	2	22,35	22,07	21.01	21,73	21,43	21,12
	6	25,33	25,02	24.96	24,67	24,32	23,95
	10	28,42	28,05	27.98	27,67	27,28	26,88
	14	31,55	31,15	31.08	30,73	30,32	29,88
	18	34,78	34,35	34.27	33,90	33,45	32,98
	22	38,10	37,65	37.57	37,17	36,68	36,17
	26	41,52	41,03	40.94	40,52	40,00	39,87
♊	0	45,03	44,52	44.42	43,98	43,43	42,87
	4	48,67	48,12	47.02	47,55	47,00	46,40
	8	52,40	51,83	51.73	51,25	50,67	50,05
	12	56,23	55,63	55.53	55,05	54,43	53,82
	16	60,20	59,60	59.49	58,98	58,35	57,70
	20	64,25	63,65	63.54	63,02	62,38	61,72
	24	68,4	67,80	67.69	67,17	66,52	65,85
	28	72,68	72,07	71.96	71,43	70,78	70,08
♋	2	77,03	76,42	76.31	75,80	75,15	74,47
	6	81,48	80,88	80.77	80,25	79,60	78,93
	10	86,02	85,42	85.31	84,78	84,15	83,48
	14	90,62	90,01	89.90	89,38	88,77	88,12
	18	95,27	94,67	94.57	94,07	93,47	92,83
	22	99,92	99,38	99,28	98,80	98,22	97,60
	26	104,07	104,12	104.02	103,57	103,00	102,40
	30	109,43	108,92	108.83	108,38	107,83	107,27

A Table of oblique Ascensions.

S.	D	31	32	52 18	33	34	35
♌	0	109,43	108,91	108,83	108,38	107,83	107,27
	4	114,18	113,70	113,61	113,18	112,67	112,13
	8	118,95	118,48	118,40	118,01	117,52	117,03
	12	123,72	123,28	123,20	122,85	122,38	121,92
	16	128,52	128,10	128,03	127,70	127,27	126,85
	20	133,25	132,98	132,81	132,50	132,12	131,72
	24	138,00	137,68	137,62	137,32	136,98	136,62
	28	142,73	142,43	142,38	142,12	141,82	141,43
♍	2	147,43	147,17	147,12	146,90	146,63	146,35
	6	152,13	151,90	151,86	151,67	151,43	151,18
	10	156,80	156,62	156,58	156,42	156,22	156,03
	14	161,47	161,32	161,29	161,15	161,00	160,83
	18	166,12	166,00	165,98	165,88	165,77	165,63
	22	170,80	170,67	170,66	170,60	170,52	170,43
	26	175,38	175,33	175,32	175,30	175,27	175,22
♎	0	180,00	180,00	180,00	180,00	180,00	180,00
	4	184,62	184,67	184,68	184,70	184,73	184,78
	8	189,20	189,33	189,34	189,40	189,48	189,57
	12	193,88	194,00	194,02	194,12	194,33	194,37
	16	198,53	198,68	198,71	198,85	199,00	199,17
	20	203,20	203,38	203,42	203,58	203,78	203,97
	24	207,87	208,10	208,14	208,33	208,57	208,82
	28	212,57	212,83	212,88	213,10	213,37	203,65
♏	2	217,27	217,57	217,62	217,88	218,18	218,52
	6	222,00	222,32	222,38	222,68	223,02	223,38
	10	226,75	227,12	227,19	227,50	227,88	228,28
	14	231,48	231,90	231,97	232,30	232,73	233,15
	18	236,28	236,72	236,80	237,15	237,62	238,08
	22	241,05	241,52	241,60	241,99	242,48	242,97
	26	245,82	246,30	246,39	246,82	247,33	247,87
	30	250,57	251,08	251,17	251,62	252,17	252,73

A Table of oblique Ascensions.

S. D.	31	32	52. 18	33	34	35
♑ 0	250,57	251,08	251,17	251.62	252,17	252,73
4	255,33	255,88	255,98	256.41	257,00	257,60
8	260,05	260,62	260,71	261.20	261,78	262,40
12	264,73	265, 3	265,43	265.93	266,53	267,17
16	269,38	269,99	270,10	270.62	271,23	271,88
20	273,90	274,58	274,69	275.22	275,85	276,52
24	278,52	279,12	279,23	279.75	280,40	281,07
28	282,97	283,58	283,69	284.20	284,85	285,53
♒ 2	287,32	287,93	288,04	288.57	289,22	289,92
6	291,58	292,20	292,31	292.83	293.48	294,15
10	295,75	296,15	296,46	296.98	297,62	298,28
14	299,80	300,42	300,51	301.02	301,65	302,30
18	303,77	304,37	304,47	304.95	305,57	306,18
22	307,60	308,17	308,27	308.75	309,23	309,95
26	311,33	311,88	312,98	312.45	313,00	313,60
♓ 0	314,97	315,48	315,58	316.02	316,57	317,13
4	318,48	318,97	319,06	319.48	320,09	320,13
8	321,90	322,35	322,41	322.8,	323,32	323,83
12	325,22	325,65	325,73	326.10	326,55	327,02
16	328,41	328,85	328,92	329.27	329,68	330,12
20	331,58	331,95	332,02	332.33	332,82	333,12
24	334,67	334,98	335,04	335.33	335,68	336,05
28	337,65	337,93	338,99	338.27	338,57	338,88
♈ 2	340,58	340,83	340,88	341.13	341,38	341,68
6	343,47	343,68	343,72	343.93	344,15	344,42
10	346,30	346,48	346,51	346.68	346,78	347,08
14	349,08	349.22	349,25	349.40	349,55	349,72
18	351,83	351,95	351,97	352.07	352,20	352,32
22	354,57	354,65	354.66	354.73	354,82	354,90
26	357,30	357,33	357,34	357.38	357,42	357,47
30	360,00	360,00	360.00	360.00	360,00	360,00

A Table of oblique Ascensions.

S. D.	36	37	38	39	40	41
♈ 0	000,00	000,00	000,00	000,00	000,00	000,00
4	02,50	02,13	02,42	02,37	02,33	02,27
8	05,03	04,93	04,85	04,77	04,67	04,57
12	07,57	07,43	07,30	07,17	07,02	06,88
16	10,12	09,95	09,77	09,58	09,40	09,22
20	12,72	12,50	12,28	12,05	11,80	11,58
24	15,35	15,10	14,82	14,57	14,27	13,98
28	18,02	17,75	17,42	17,12	16,80	16,47
♉ 2	20,77	20,45	20,08	19,73	19,37	18,98
6	23,58	23,20	22,82	22,42	22,00	21,57
10	26,48	26,05	25,63	25,18	24,73	24,25
14	29,43	28,97	28,52	28,03	27,53	27,02
18	32,50	32,02	31,50	30,97	30,43	29,88
22	35,67	35,13	34,58	34,03	33,45	32,87
26	38,93	38,35	37,78	37,18	36,57	35,93
♊ 0	42,30	41,70	41,10	40,47	39,82	39,15
4	45,80	45,18	44,53	43,90	43,20	42,50
8	49,42	48,78	48,10	47,43	46,72	46,00
12	53,15	52,50	51,82	51,10	50,38	49,63
16	57,05	56,37	55,65	54,93	54,18	53,42
20	61,05	60,35	59,63	58,88	58,12	57,33
24	65,17	64,47	63,73	62,99	62,20	61,40
28	69,40	68,70	67,97	67,22	66,43	65,63
♋ 2	73,78	73,07	72,33	71,58	70,78	69,99
6	78,25	77,55	76,82	76,07	75,28	74,48
10	82,82	82,12	81,40	80,65	79,88	79,10
14	87,47	86,77	86,07	85,35	84,58	83,82
18	92,18	91,52	90,83	90,13	89,40	88,65
22	96,97	96,32	95,67	94,98	94,28	93,55
26	101,82	101,18	100,57	99,90	99,22	98,52
30	106,70	106,10	105,50	104,87	104,22	103,55

A Table of Oblique Ascensions.

S.	D.	36	37	38	39	40	41
♑	0	106,70	106,10	105,50	104.87	104.22	103.55
	4	111,60	111,03	110,45	109.87	109.25	108.62
	8	116,50	115,98	115,43	114.88	114.30	113.70
	12	121,43	120,95	120,45	119.92	119.37	118.82
	16	126,38	125,93	125,46	124.98	124.47	123.95
	20	131,32	130,88	130,47	130.02	129.57	129.08
	24	136,25	135,86	135,47	135.08	134.67	134.23
	28	141,15	140,82	140,46	140.12	139.77	139.37
♒	2	146,05	145,75	145,45	145.13	144.80	144.48
	6	150,95	150,68	150,42	150.14	149.87	149.58
	10	155,82	155,60	155,38	155.15	154.90	154.68
	14	160,68	160,50	160,32	160,14	159.95	159.77
	18	165,52	165,38	165,25	165.12	164.98	164.83
	22	170,35	170,27	170,17	170.08	170.00	169.88
	26	175,18	175,13	175,10	175.05	175.00	174.95
♓	0	180,00	180,00	180,00	180.00	180.00	180.00
	4	184,82	184,87	184,90	184.95	185.00	185.05
	8	189,65	189,73	189,83	189.92	190.00	190.12
	12	194,48	194,62	194,75	194.88	194.92	195.17
	16	199,32	199,50	199,68	199.86	200.05	200.23
	20	204,18	204,40	204,62	204.85	205.10	205.32
	24	209,05	209,32	209,58	209.86	210.13	210.42
	28	213,95	214,25	214,55	214.87	215.20	215.52
♈	2	218,85	219,18	219,54	219.88	220.27	220.63
	6	223,75	224,14	224,53	224.92	225.33	225.77
	10	228,68	229,12	229,53	229.98	230.45	230.92
	14	233,62	234,07	234,54	235.02	235.53	236.05
	18	238,57	239,05	239,55	240.08	240.63	241.18
	22	243,50	244,02	244,57	245.12	245.70	246.30
	26	248,40	248,97	249,55	250.13	250.75	251.38
	30	253,30	253,90	254,50	255.13	255.78	256.45

A Table of oblique Ascensions.

S.	D.	36	37	38	39	40	41
♈	0	253,30	253,90	254,50	255,13	255,78	256,45
	4	258,13	258,82	259,43	260,10	260,78	261,48
	8	263,03	263,68	264,33	265,02	265,72	266,45
	12	267,82	268,48	269,17	269,87	270,60	271,35
	16	272,53	273,23	273,93	274,65	275,42	276,18
	20	277,18	277,88	278,60	279,35	280,12	280,90
	24	281,75	282,45	283,18	283,93	284,72	285,52
	28	286,22	286,93	287,67	288,92	289,22	290,01
♉	2	290,60	291,30	291,03	292,78	293,57	294,37
	6	294,83	295,53	296,27	297,01	279,80	298,60
	10	298,95	299,65	300,37	301,12	301,88	302,67
	14	302,95	303,63	304,35	30 ,07	305,82	306,58
	18	306,85	307,50	308,18	308,90	309,62	310,37
	22	310,58	311,22	311,90	312,57	313,28	314,00
	26	314,20	314,82	315,47	316,10	316,80	317,50
♊	0	317,70	318,30	318,90	319,53	320,18	320,85
	4	321,07	321,65	322,22	322,82	323,43	324,07
	8	324,33	324,87	325,42	325,97	326,55	327,13
	12	327,50	328,00	328,50	329,03	329,57	330,12
	16	330,57	331,03	331,48	331,97	332,47	332,98
	20	333,52	333,95	334,37	334,82	335,27	335,75
	24	336,42	336,80	337,18	337,58	338,00	338,43
	28	339,23	339,55	339,92	340,27	340,63	341,02
♋	2	341,97	342,25	342,58	342,88	343,20	343,53
	6	344,65	344,90	345,18	345,43	345 73	346,02
	10	347,28	347,50	347,72	347,95	348,20	348,42
	14	349,88	350,05	350,23	350,42	350,60	350,78
	18	352,43	352,57	352,70	352,83	352,98	353,12
	22	354,97	355,07	355,15	355,23	355,13	353,43
	26	357,50	357,87	357,58	357,63	357,67	357,73
	30	360,00	360,00	360,00	360,00	360,00	360,00

A Table of oblique Ascensions.

S.	D.	42	43	44	45	46	47
♈	0	000,00	00,00	000,00	000,00	000,00	000,00
	4	02,12	02,18	02,13	02,07	02,00	01,92
	8	04,47	04,37	04,27	04,15	04,03	03,92
	12	06,73	06,57	06,42	06,25	06,08	05,92
	16	09,00	08,80	08,60	08,38	08,15	07,92
	20	11,33	11,07	10,82	10,53	10,25	09,97
	24	13,70	13,40	13,08	12,73	12,40	12,05
	28	16,12	15,77	15,40	15,02	14,62	24,20
♉	2	18,60	18,20	17,77	17,33	16,88	16,42
	6	21,13	20,68	20,20	19,72	19,22	18,68
	10	23,77	23,27	22,75	22,20	21,65	21,07
	14	26,48	25,93	25,37	24,78	24,17	23,52
	18	29,30	28,73	28,19	27,47	26,78	26,08
	22	32,25	31,62	30,95	30,25	29,55	28,80
	26	35,27	34,58	33,88	33,17	32,38	31,77
♊	0	38,45	37,73	36,98	36,23	35,40	34,57
	4	41,77	41,03	40,23	39,42	38,57	37,68
	8	45,22	44,45	43,63	42,78	41,87	40,97
	12	48,85	48,03	47,18	46,30	45,40	44,42
	16	52,60	51,77	50,88	49,98	49,05	48,05
	20	56,50	55,65	54,78	53,83	52,88	51,87
	24	60,57	59,72	58,80	57,87	56,88	55·87
	28	64,70	63,92	63,01	62,07	61,07	60,05
♋	2	69,03	68,28	67,35	66,43	65,45	64,42
	6	73,65	72,78	71,88	70,93	69,97	68,95
	10	78,27	77,42	76,53	75,60	74,65	73,63
	14	83,02	82,18	81,30	80,40	79,47	78,47
	18	87,87	87,07	86,20	85,33	84,42	83,43
	22	92,78	92,01	91,18	90,33	89,45	88,52
	26	97,78	97,03	96,25	95,43	94,58	93,70
	30	102,85	102,13	101,38	100,62	99,80	98,97

A Table of obtique Ascensions.

S.	D.	42	43	44	45	46	47
♑	0	102,15	102,13	101,38	100.62	99,80	98.97
	4	107,95	107,27	106,57	105.84	105.07	104.28
	8	113,08	112,45	111,78	111.10	110.38	109.63
	12	118,25	117,65	117,03	116.38	115.73	115.03
	16	123,43	122,88	122,32	121.70	121.27	120.47
	20	128,60	128,10	127,58	127.05	126.48	125.90
	24	133,90	133,15	132,87	132.42	131.87	131.33
	28	138,97	138,57	138,13	137.72	137.25	136.78
♒	2	144,13	143,78	143,40	143.03	142.63	142.50
	6	149,30	148,98	148,67	148.33	148.00	147.65
	10	154,43	154,17	153,92	153.63	153.35	153.07
	14	159,57	159,37	159,15	158 93	158.70	158.47
	18	164,68	164,52	164,37	164.20	164.03	163.87
	22	169,80	169,68	169,58	169.47	169.37	169.25
	26	174,90	174,85	174,80	174.73	174.67	174.63
♓	0	180,00	180,00	180,00	180.00	180.00	180.00
	4	185,10	185,15	185,20	185.27	185.33	185.37
	8	190,20	190,32	190,42	190.53	190.63	190.75
	12	195,32	195,48	195,63	195.80	195.97	196.13
	16	200,43	200,63	200,85	201.07	201.30	201.53
	20	205,57	205,83	206,08	206.37	206.65	206.93
	24	210,70	211,02	211,33	211.67	212.00	212.35
	28	215,87	216,22	216,60	216.97	217.37	217.50
♈	2	221,03	221,43	221,87	222.28	222.75	223.22
	6	226,20	226,65	227,13	227.58	228.13	228.67
	10	231,40	231,90	232,42	232.97	233.52	234.10
	14	236,58	237,12	237,68	238.20	238.73	239.53
	18	241,75	242,35	242,97	243.62	244.27	244.97
	22	246,92	247,55	248,22	248.90	249.62	250.37
	26	252,05	252,73	253,43	254.17	254.93	255.72
	30	257,15	257,87	258,62	259,38	260.20	261.03

A Table of Oblique Ascensions.

S. D.	42	43	44	45	46	47
♑ 0	257,15	257,87	258,62	259,38	260,20	261,03
4	262,12	262,97	263,75	264,57	265,42	266,20
8	267,22	267,99	268,82	269,67	270,55	271,48
12	272,13	272,93	273,80	274,67	275,58	276,57
16	276,98	277,82	278,80	279,60	280,53	281,53
20	281,73	282,58	283,47	284,40	285,35	286,37
24	286,35	287,22	288,12	289,07	290,03	291,05
28	290,97	291,72	292,65	293,57	294,55	295,58
♒ 2	295,30	296,08	296,99	297,93	298,93	299,95
6	299,43	300,28	301,20	302,13	303,12	304,13
10	30 ,56	304,35	305,32	306,17	307,12	308,13
14	307,40	308,23	309,12	310,02	310,95	311,95
18	311,15	311,97	313,82	313,60	314,60	315,58
22	314,78	315,55	316,37	317,22	318,13	319,03
26	318,23	318,97	319,77	320,58	321,43	322,32
♓ 0	321,55	322,27	323,02	323,77	324,60	325,43
4	324,73	325,42	326,12	326,83	327,62	328,23
8	327,75	328,38	329,05	329,75	330,45	331,20
12	330,70	331,27	331,90	332,53	333,22	333,92
16	333,52	334,07	334,63	335,22	335,83	336,43
20	336,23	336,73	337,15	337,80	338,35	338,93
24	338,87	339,32	339,80	340,28	340,78	341,32
28	341,40	341,80	34 ,23	342,67	343,12	34 ,58
♈ 2	343, 8	344,23	344,60	344,98	345,38	345,80
6	346,30	346,60	346,92	347,17	347,60	347 95
10	348,63	34 ,93	349.18	349,47	349,75	350,03
14	351,00	351,10	351,40	351,62	351,85	352,08
18	353,27	353,43	353,58	353,75	35 ,92	354,08
22	355,53	355,63	355,73	355,85	255,97	356, 8
26	357,78	357,82	357,87	357,93	358,00	35 ,08
30	360,00	360 00	360,00	360,00	360,00	360,00

A Table of oblique Ascensions.

S. D.	47. 47	48	49	50	51	51. 53
♈ 0	00,00	00, 00	00, 00	00,00	00. 00	00, 00
4	01,90	01, 88	01, 83	01, 77	01. 68	01, 65
8	03,87	03, 80	03, 67	03, 53	03. 40	03, 32
12	03,83	05, 73	05, 53	05, 37	05. 13	05, 02
16	07,81	07, 67	07, 42	07, 15	06. 87	06, 72
20	09,82	09, 65	09, 33	09, 00	08. 67	08, 48
24	11,88	11, 68	11, 30	10, 92	10. 50	10, 27
28	14,00	13, 77	13, 33	12, 87	12. 38	12, 12
♉ 2	16,19	15, 93	15, 42	14, 88	14. 33	14, 04
6	18,43	18, 15	17, 57	16, 97	16. 35	16, 00
10	20,73	20, 35	19, 82	19, 15	18. 47	18, 08
14	23,18	22, 85	22, 17	21, 43	20. 67	20, 23
18	25,73	25, 38	24, 47	23, 82	23. 01	22, 55
22	28,40	28, 03	27, 22	26, 35	25. 47	24, 97
26	31, 22	30, 77	29, 88	28, 98	28. 02	27, 50
♊ 0	34, 13	33, 68	32, 75	31, 78	30. 77	30, 20
4	37, 23	36, 75	35, 78	34, 77	33. 70	33, 10
8	40, 48	40, 01	38, 98	37, 92	36. 80	36, 13
12	43, 90	43, 40	42, 37	41, 23	40. 08	39, 43
16	47, 53	47, 02	45, 93	44. 78	43. 58	42, 92
20	51, 38	50, 40	49, 70	48, 53	47. 32	46, 60
24	55, 35	54, 80	53, 67	52, 48	51, 22	50, 50
28	59, 50	58, 97	57, 83	56, 63	55. 37	54, 65
♋ 2	63, 87	63, 33	62, 18	61, 00	59. 73	59, 01
6	68, 42	67, 87	66, 73	65, 55	64. 30	63, 58
10	73, 12	72, 57	71, 47	70, 30	69. 07	68, 37
14	77, 97	77, 43	76, 33	75, 20	73. 98	73, 32
18	82, 93	82, 43	81, 40	80, 17	79. 13	7 , 47
22	88, 05	87, 57	86, 53	85, 35	84. 35	83, 72
26	93, 27	92, 77	91, 80	90, 78	89. 70	89, 10
30	98, 53	98, 08	97, 15	96, 18	95. 17	94, 60

A Table of oblique Ascensions.

S. D	47. 47	48	49	50	51	51. 53
♌ 0	098,53	098,08	097,15	096,18	095,17	094,60
4	103,88	103,45	102,57	101,67	100,70	100,17
8	109,27	108,87	108,05	107,20	106,30	105,80
12	114,70	114,32	113.77	112,77	111,95	111,48
16	120,15	119,80	119.12	118,38	117,62	117,18
20	125,62	125,28	124.65	123,98	123,30	122,92
24	131,08	130,82	130.22	129,62	129,02	128,67
28	136,53	136,30	135.80	135,27	134,72	134,40
♍ 2	142,02	141,78	141.35	140,88	140,40	140,13
6	147,43	147,28	146.90	146,50	146,10	145,87
10	152,92	152,75	152.43	152,10	151,77	151,57
14	158,33	158,22	157.97	157,70	157,43	157,27
18	163,75	163,68	163,48	163,28	163,08	162,97
22	169,18	169,13	169.00	168.87	168,73	168,65
26	174,66	174,57	174.51	174,45	174,37	174,33
♎ 0	180,00	180,00	180.00	180,00	180,00	180,00
4	185,40	185,43	185.49	185,55	185,63	185,67
8	190,82	190,87	191.00	191,13	191,27	191,35
12	196,25	196,32	196.52	196,72	196,92	197,03
16	201,67	201,78	202.03	202,30	202,57	202,73
20	207,08	207,25	207.57	207,90	208,23	208,43
24	212,57	212,72	213.10	213,50	213,90	214,13
28	217,98	218,22	218.65	219,12	219,60	219,87
♏ 2	223,47	223,70	224.30	224,73	225,28	225,60
6	228,92	229.18	229.78	230,38	230,98	231,33
10	234,38	234,72	235.35	236,02	236,70	237,08
14	239,85	240.20	240.20	241,62	242,38	242,82
18	245,30	245,68	246,62	247,28	248,05	248,52
22	250,73	251,13	251.97	252,70	253,70	254,20
26	256,12	256,55	257,43	258,33	259,30	259,83
30	261,47	261,92	262.85	263,82	264,83	265,40

A Table of oblique Ascensions.

S. D.	47	48	49	50	51	51.53
♑ 0	261,47	261,92	262,85	263,12	264,83	265,40
4	266,23	267,13	268,20	269,20	270,30	270,90
8	272,95	272,43	273,47	274,65	275,65	276,28
12	277,07	277,57	278,60	279,72	280,87	281,53
16	282,03	282,57	283,67	284,80	286,02	286,68
20	286,88	287,43	288,53	289,70	290,93	291,63
24	291,58	292,13	293,27	294,45	295,70	296,42
28	296,13	296,67	297,82	299,00	300,27	300,99
♒ 2	300,50	301,23	301,17	303,37	304,63	305,35
6	304,65	305,20	306,33	307,52	308,78	309,50
10	308,62	309,60	310,30	311,47	312,68	313,40
14	312,47	312,98	314,07	315,22	316,42	317,08
18	316,10	316,60	317,63	318,77	319,92	320,57
22	319,52	319,99	321,02	322,08	313,30	343,17
26	322,77	323,25	324,22	325,23	326,30	326,90
♓ 0	325,87	326,32	327,35	328,22	329,23	329,80
4	328,78	329,13	330,11	331,02	331,98	332,50
8	331,60	331,97	3 2,78	333,65	334,53	335,03
12	334,27	334,62	335,53	336,18	336,99	337,45
16	336,82	337,15	337,83	338,57	339,33	339,77
20	339,27	339,65	340,18	340,85	341,53	341,92
24	341,57	341,85	342,43	343,03	343,65	344,00
28	343,81	344,07	344,58	345,12	345,67	345,99
♈ 2	346,00	346,23	346,67	347,13	347,52	347,88
6	34 ,12	348,32	348,70	349,08	349,50	349,7
10	350,18	350,35	350,67	351,00	351,33	351,52
14	352,19	35 ,33	352,58	352,85	353,13	353,28
18	354,17	354,27	354,47	354,63	354,87	354,98
22	356,13	356,20	356,33	356,47	356,60	356,68
26	358,10	358,12	358,17	358,32	358,32	358,35
30	360,00	360,00	360,00	360,00	360,00	360,00

A Table of oblique Ascensions.

S.	D.	52	53	54	55	56	57
♈	0	00, 00	00, 00	00. 00	00, 00	00, 00	00, 00
	4	01, 62	01, 53	01. 47	01, 38	01, 30	01, 20
	8	03, 25	03, 10	02. 95	02, 78	02, 62	02, 43
	12	04, 92	04, 68	04. 45	04, 20	03, 95	03, 67
	16	06, 58	06, 28	05. 97	05, 65	05, 28	04, 93
	20	08, 30	07, 92	07. 53	07, 12	06, 68	06, 22
	24	10, 07	09, 60	09. 13	08, 63	08, 10	07, 55
	28	11, 88	11, 33	10. 78	10, 22	09, 58	08, 93
♉	2	13, 75	13, 13	12. 33	11, 83	11, 12	10, 37
	6	15, 70	15, 02	14. 30	13, 53	12, 73	11, 87
	10	17, 75	16, 98	16. 18	15, 33	14, 43	13, 48
	14	19, 87	19, 03	18. 13	17, 50	16, 22	15, 18
	18	22, 13	21, 23	20. 25	19, 23	18, 25	17, 00
	22	24, 52	23, 52	22. 47	21, 37	20, 20	18, 93
	26	27, 03	25, 97	24. 83	23, 65	22, 37	21, 01
♊	0	29, 70	28, 37	27. 37	26, 10	24, 73	23, 28
	4	32, 57	31, 37	30. 10	28, 73	27, 32	25, 75
	8	35, 60	34, 37	33. 01	31, 58	30, 08	28, 45
	12	38, 85	37, 53	36. 12	34, 68	33, 05	31, 35
	16	42, 32	40, 95	39. 52	37, 98	36, 33	34, 55
	20	45, 98	44, 60	43. 12	41, 55	39, 85	38, 00
	24	49, 88	48, 48	46. 97	45, 38	43, 63	41, 77
	28	54, 03	52, 58	51. 08	49, 47	47, 73	45, 85
♋	2	58, 40	56, 98	55. 47	53, 82	52, 08	50, 20
	6	63, 07	61, 55	60. 05	58, 45	56, 72	54, 83
	10	67, 75	66, 37	64. 88	63, 32	61, 62	59, 77
	14	72, 73	71, 37	69. 93	68, 40	66, 73	64, 95
	18	77, 87	76, 57	75. 17	73, 68	72, 08	70, 38
	22	83, 17	81, 92	80. 58	79, 03	77, 62	75, 98
	26	88, 57	87, 37	86. 10	84, 75	83, 32	81, 77
	30	94, 10	92, 97	91, 77	90, 63	89, 12	87, 68

A Table of oblique Ascensions.

S.	D.	52	53	54	55	56	57
♑	0	094,10	092,97	091,77	090,63	089,13	087,68
	4	099,70	098,63	097,52	096,33	095,07	09 ,70
	8	105,37	104,37	103,32	102,23	101,05	099,78
	12	111,07	110,15	109,18	108,17	107,08	105,93
	16	116,82	115,98	115,08	114,18	113,17	112,12
	20	122,58	121,82	121,01	120,19	119,27	118,32
	24	128,37	127,68	126,95	126,20	125,40	124,52
	28	134,13	133,53	132,88	132,21	131,50	130,75
♍	2	139,90	139,37	138,80	138,22	137,60	136,95
	6	145,67	145,20	144,72	144,22	143,70	143,13
	10	151,40	151,01	150,63	150,21	149,78	149,32
	14	157,13	156,83	156,52	156,18	155,85	155,48
	18	162,87	162,63	162,40	162,17	161,90	161,62
	22	168,58	168,43	168,27	168,12	167,95	167,75
	26	174,30	174,22	174,13	174,07	173,98	173,88
♎	0	180,00	180,00	180,00	180,00	180,00	180,00
	4	185,70	185,78	185,87	185,93	186,02	186,12
	8	191,42	191,57	191,73	191,88	192,05	192,25
	12	197,13	197,37	197,60	197,83	198,10	198,38
	16	202,87	203,17	203,48	203,82	204,15	204,52
	20	208,60	208,99	209,37	209,79	210,22	210,68
	24	214,32	214,80	215,28	215,78	216,30	216,87
	28	220,10	220,63	221,20	221,78	222,40	223,05
♏	2	225,87	226,47	227,12	227,79	228,50	229,25
	6	231,63	232,32	233,05	233,80	234,60	235,48
	10	237,42	238,18	238,99	239,81	240,73	241,68
	14	243,18	244,02	244,92	245,82	246,83	247,88
	18	248,93	249,85	250,82	251,83	252,92	254,07
	22	254,62	255,63	256,68	257,77	258,95	260,22
	26	260,30	261,37	262,48	263,67	264,93	266,30
	30	265,90	267,03	268,23	269,37	270,87	272,32

A Table of oblique Ascensions.

S. D.	52°	53	54	55	56	57
♐ 0	265,90	267,03	268,23	269,37	270,87	272,32
4	271,43	272,63	273,90	275,25	276,68	278,23
8	276,83	278,08	279,42	280,87	282,38	284,02
12	282,13	283,43	284,83	286,32	287,92	289,62
16	287,27	288,63	290,07	291,60	293,27	295,05
20	292,25	293,63	295,12	296,68	298,38	300,23
24	297,03	298,45	299,95	301,55	303,28	305,17
28	301,60	303,02	304,53	306,18	307,92	309,80
♑ 2	305,97	307,42	308,92	310,53	312,27	314,15
6	310,12	311,52	313,03	314,62	316,37	318,23
10	314,02	315,40	316,88	318,45	320,15	322,00
14	317,68	319,05	320,48	322,02	323,67	325,45
18	321,15	322,47	323,87	325,32	326,95	328,65
22	324,40	325,63	326,99	328,42	329,92	331,55
26	327,43	328,63	329,90	331,27	332,68	334,25
♒ 0	330,30	331,43	332,63	333,90	335,27	336,72
4	332,97	334,03	335,17	336,35	337,63	338,99
8	335,48	336,48	337,53	338,63	339,80	341,07
12	337,87	338,78	339,75	340,77	341,85	343,00
16	340,13	340,97	341,87	342,50	343,78	344,82
20	342,25	343,02	343,82	344,67	345,57	346,52
24	344,36	344,98	345,70	346,47	347,27	348,13
28	346,25	346,87	347,67	348,17	348,88	349,63
♓ 2	348,15	348,67	349,22	349,78	350,42	351,07
6	349,12	350,40	350,87	351,37	351,90	352,45
10	351,93	352,08	352,47	352,88	353,32	353,78
14	353,70	353,72	354,03	354,35	354,72	355,07
18	355,42	355,32	355,55	355,80	356,05	356,33
22	356,08	356,90	357,05	357,22	357,38	357,57
26	358,75	358,43	358,53	358,62	358,70	358,80
30	360,00	360,00	360,00	360,00	360,00	360,00

A Table of Positions for the

North Declination under the Earth, and South above it.

Pole of	1	2	3	4	5	6	7
0	0, 79	1, 58	2, 38	3, 17	3, 98	4, 80	5, 62
1	0, 78	1, 55	2, 33	3, 10	3, 90	4, 70	5, 50
2	0, 75	1, 52	2, 27	3, 03	3, 82	4, 58	5, 37
3	0, 73	1, 48	2, 22	2, 95	3, 73	4, 48	5, 25
4	0, 72	1, 45	2, 17	2, 88	3, 63	4, 38	5, 12
5	0, 70	1, 42	2, 12	2, 82	3, 55	4, 27	5, 00
6	0, 68	1, 38	2, 07	2, 75	3, 45	4, 17	4, 88
7	0, 67	1, 35	2, 01	2, 67	3, 37	4, 07	4, 75
8	0, 65	1, 30	1, 97	2, 60	3, 28	3, 95	4, 63
9	0, 63	1, 27	1, 90	2, 53	3, 18	3, 85	4, 50
10	0, 60	1, 23	1, 85	2, 47	3, 10	3, 73	4, 38
11	0, 58	1, 20	1, 80	2, 38	3, 02	3, 63	4, 25
12	0, 57	1, 17	1, 75	2, 32	2, 92	3, 52	4, 12
13	0, 55	1, 12	1, 68	2, 23	2, 83	3, 42	4, 00
14	0, 53	1, 08	1, 63	2, 17	2, 73	3, 30	3, 87
15	0, 52	1, 05	1, 58	2, 10	2, 63	3, 18	3, 73
16	0, 50	1, 01	1, 52	2, 01	2, 55	3, 07	3, 60
17	0, 48	0, 97	1, 47	1, 93	2, 45	2, 97	3, 47
18	0, 47	0, 93	1, 40	1, 87	2, 35	2, 85	3, 33
19	0, 43	0, 90	1, 35	1, 78	2, 25	2, 73	3, 20
20	0, 42	0, 85	1, 28	1, 72	2, 17	2, 60	3, 05
21	0, 40	0, 82	1, 23	1, 63	2, 07	2, 48	2, 92
22	0, 38	0, 77	1, 17	1, 55	1, 95	2, 37	2, 77
23	0, 37	0, 73	1, 10	1, 47	1, 85	2, 25	2, 63
24	0, 33	0, 70	1, 05	1, 38	1, 75	2, 12	2, 48
25	0, 32	0, 65	0, 98	1, 30	1, 65	1, 98	2, 33
26	0, 30	0, 60	0, 92	1, 22	1, 53	1, 87	2, 18
27	0, 27	0, 57	0, 85	1, 12	1, 43	1, 73	2, 03
28	0, 25	0, 52	0, 78	1, 03	1, 32	1, 60	1, 87
29	0, 23	0, 47	0, 72	0, 95	1, 20	1, 47	1, 72
30	0, 20	0, 43	0, 65	0, 85	1, 08	1, 32	1, 55
31	0, 18	0, 38	0, 58	0, 77	0, 97	1, 18	1, 38
32	0, 17	0, 33	0, 50	0, 76	0, 85	1, 03	1, 22

Latitude of 51 deg. 53 parts.

Positiõ.	1	2	3	4	5	6	7
32	1. 40	2, 83	4, 27	5, 67	7, 12	8, 57	10, 02
31	1. 38	2, 78	4, 18	5, 57	7, 00	8, 42	9, 85
30	1. 37	2, 73	4, 12	5, 48	6, 88	8, 28	9, 68
29	1. 33	2, 70	4, 05	5, 38	6, 77	8, 13	9, 52
28	1. 31	2, 65	3, 98	5, 30	6, 65	8, 00	9, 37
27	1. 30	2, 60	3, 91	5, 22	6, 53	7, 87	9, 20
26	1. 27	2, 57	3, 85	5, 12	6, 43	7, 73	9, 05
25	1. 25	2, 51	3, 78	5, 03	6, 32	7, 62	8, 90
24	1. 23	2, 47	3, 72	4, 95	6, 22	7, 48	8, 75
23	1. 20	2, 43	3, 67	4, 87	6, 12	7, 35	8, 60
22	1. 18	2, 40	3, 60	4, 78	6, 02	7, 23	8, 47
21	1. 17	2, 35	3, 53	4, 70	5, 90	7, 12	8, 32
20	1. 15	2, 31	3, 48	4, 62	5, 80	7, 00	8, 18
19	1. 13	2, 27	3, 41	4, 55	5, 72	6, 87	8, 03
18	1. 10	2, 23	3, 37	4, 47	5, 62	6, 75	7, 90
17	1. 08	2, 20	3, 30	4, 40	5, 52	6, 63	7, 73
16	1. 07	2, 15	3, 25	4, 31	5, 42	6, 53	7, 63
15	1. 05	2, 12	3, 18	4, 23	5, 33	6, 42	7, 50
14	1. 03	2, 08	3, 13	4, 17	5, 23	6, 30	7, 37
13	1. 02	2, 05	3, 08	4, 10	5, 13	6, 18	7, 23
12	1. 00	2, 01	3, 02	4, 02	5, 05	6, 08	7, 12
11	0. 98	1, 97	2, 97	3, 95	4, 95	5, 97	6, 98
10	0. 97	1, 93	2, 91	3, 87	4, 87	5, 87	6, 85
9	0. 93	1, 90	2, 85	3, 80	4, 78	5, 75	6, 73
8	0. 91	1, 87	2, 80	3, 73	4, 68	5, 65	6, 60
7	0. 90	1, 83	2, 75	3, 67	4, 60	5, 53	6, 48
6	0. 88	1, 80	2, 70	3, 58	4, 52	5, 43	6, 35
5	0. 87	1, 75	2, 65	3, 52	4, 42	5, 33	6, 23
4	0. 85	1, 71	2, 58	3, 45	4, 33	5, 22	6, 12
3	0. 83	1, 68	2, 53	3, 38	4, 25	5, 12	5, 98
2	0. 81	1, 65	2, 48	3, 30	4, 15	5, 02	5, 87
1	0. 80	1, 62	2, 43	3, 23	4, 07	4, 90	5, 73
0	0. 97	1, 58	2, 38	3, 17	3, 98	4, 80	5, 62

South Declination under the Earth, and North above it.

A Table of Positions for the

Pole of	8	9	10	11	12	13	14
0	6, 45	7, 22	8, 05	8, 88	9, 73	10, 57	11, 60
1	6, 32	7, 07	7, 87	8, 68	9, 52	10, 33	11, 18
2	6, 17	6, 90	7, 70	8, 50	9, 32	10, 10	10, 98
3	6, 03	6, 73	7, 52	8, 30	9, 10	9, 87	10, 68
4	5, 88	6, 58	7, 35	8, 10	8, 88	9, 63	10, 43
5	5, 75	6, 42	7, 17	7, 92	8, 67	9, 42	10, 18
6	5, 60	6, 17	6, 98	7, 72	8, 45	9, 18	9, 93
7	5, 47	6, 10	6, 82	7, 51	8, 23	8, 95	9, 68
8	5, 32	5, 95	6, 63	7, 31	8, 02	8, 70	9, 43
9	5, 18	5, 78	6, 45	7, 11	7, 80	8, 47	9, 17
10	5, 03	5, 62	6, 27	6, 91	7, 58	8, 23	8, 92
11	4, 88	5, 45	6, 08	6, 71	7, 37	8, 00	8, 65
12	4, 73	5, 28	5, 90	6, 51	7, 15	7, 75	8, 40
13	4, 58	5, 12	5, 72	6, 31	6, 92	7, 52	8, 13
14	4, 45	4, 95	5, 53	6, 10	6, 70	7, 27	7, 87
15	4, 28	4, 78	5, 35	5, 90	6, 47	7, 02	7, 60
16	4, 13	4, 62	5, 15	5, 69	6, 23	6, 77	7, 33
17	3, 98	4, 43	4, 97	5, 48	6, 00	6, 52	7, 07
18	3, 83	4, 27	4, 73	5, 27	5, 77	6, 27	6, 78
19	3, 68	4, 08	4, 57	5, 05	5, 45	6, 00	6, 52
20	3, 52	3, 92	4, 37	4, 83	5, 23	5, 75	6, 23
21	3, 35	3, 73	4, 17	4, 60	5, 05	5, 48	5, 93
22	3, 20	3, 55	3, 97	4, 38	4, 80	5, 22	5, 65
23	3, 03	3, 37	3, 75	4, 15	4, 55	4, 95	5, 32
24	2, 87	3, 17	3, 55	3, 92	4, 30	4, 67	5, 07
25	2, 70	2, 98	3, 33	3, 68	4, 05	4, 38	4, 75
26	2, 52	2, 78	3, 12	3, 45	3, 78	4, 10	4, 45
27	2, 35	2, 58	2, 90	3, 20	3, 52	3, 82	4, 13
28	2, 17	2, 38	2, 67	2, 95	3, 25	3, 52	3, 82
29	1, 98	2, 18	2, 43	2, 70	2, 97	3, 22	3, 48
30	1, 80	1, 98	2, 20	2, 43	2, 68	2, 90	3, 15
31	1, 60	1, 75	1, 97	2, 18	2, 40	2, 60	2, 82
32	1, 42	1, 53	1, 72	1, 90	2, 10	2, 27	2, 47

North Declination under the Earth, and South above it.

Latitude of 51 deg. 53 parts.

South Declination under the Earth, And North above it.

Position	8	9	10	11	12	13	14
32	11,48	12,90	14.38	15,87	17,37	18,87	20,40
31	11,30	12,68	14.13	15,58	17,07	18,53	20,05
30	11,10	12,47	13.90	15,33	16,78	18,23	19,72
29	10,92	12,25	13.67	15,07	16,50	17,92	19,38
28	10,73	12,05	13.43	14,82	16,22	17,61	19,05
27	10,55	11,85	13.20	14,57	15,95	17,31	18,73
26	10,38	11,65	12.98	14,32	15,68	17,03	18,42
25	10,20	11,45	12.77	14,08	15,42	16,75	18,12
24	10,03	11,27	12.55	13,85	15,17	16,47	17,80
23	9,87	11,07	12.35	13,62	14,92	16,18	17,55
22	9,70	10,88	12.13	13,38	14,67	15,92	17,22
21	9,55	10,70	11.93	13,17	14,42	15,65	16,93
20	9,38	10,52	11.73	12,93	14,17	15,38	16,63
19	9,22	10,35	11.53	12,72	14,02	15,13	16,35
18	9,07	10,17	11.33	12,50	13,70	14,87	16,08
17	8,92	10,00	11.13	12,28	13,47	14,62	15,80
16	8,77	9,82	10.95	12,08	13,23	14,37	15,53
15	8,62	9,65	10.75	11,87	13,00	14,12	15,27
14	8,45	9,48	10.57	11,67	12,77	13,87	15,00
13	8,32	9,32	10.38	11,45	12,57	13,62	14,73
12	8,17	9,15	10.20	11,25	12,32	13,38	14,47
11	8,01	8,98	10.01	11,05	12,10	13,13	14,22
10	7,87	8,82	9.83	10,85	11,88	12,90	13,95
9	7,72	8,65	9.65	10,65	11,67	12,67	13,70
8	7,58	8,48	9.47	10,45	11,45	12,43	13,43
7	7,43	8,33	9.28	10,25	11,23	12,18	13,18
6	7,30	8,17	9.12	10,05	11,02	11,95	12,93
5	7,15	8,02	8.93	9,85	10,80	11,72	12,63
4	7,02	7,85	8.75	9,67	10,58	11,50	12,43
3	6,87	7,70	8.58	9,47	10,37	11,27	12,18
2	6,73	7,53	8.40	9,27	10,15	11,03	11,93
1	6,58	7,37	8.23	9,08	9,95	10,80	11,68
0	6,45	7,22	8.05	8,88	9,73	10,57	11,43

A Table of Positions for the

North Declination under the Earth, and South above it.

Pole of	15	16	17	18	19	20	21
0	12,30	13.18	14,07	14,95	15.87	16,80	17,77
1	12,03	12.90	13,77	14,63	15.52	16,43	17,38
2	11,77	12.62	13,45	14,30	15.18	16,07	17,00
3	11,50	12.32	13,15	13,97	14.83	15,70	16,62
4	11,23	12.07	12,83	13,65	14.48	15,35	16,23
5	10,97	11.75	12,53	13,32	14.13	14,98	15,85
6	10,68	11.45	12,23	13,00	13.80	14,60	15,45
7	10,35	11.17	11,92	12,67	13.45	14,23	15,07
8	10,01	10.87	11,60	12,33	13,10	13,87	14,67
9	9,97	10.58	11,28	12,00	12,73	13,50	14,28
10	9,60	10.28	10,98	11,67	12,38	13,12	13,88
11	9,32	9.98	10,67	11,33	12,03	12,75	13,48
12	9,03	9.63	10,33	10,98	11,67	12,37	13,08
13	8,75	9.38	10,02	10,65	11,30	11,98	12,68
14	8,47	9.08	9,70	10,30	10,95	11,60	12,27
15	8,18	8,78	9,37	9,95	10,57	11,20	11,87
16	7,90	8.47	9,03	9,60	10,20	10,82	11,45
17	7,60	8.15	8,70	9,25	9,83	10,42	11,03
18	7,30	7.83	8,37	8,88	9,45	10,01	10,60
19	7,00	7.52	8,01	8,53	9,05	9,60	10,17
20	6,70	7.20	7,68	8,17	8,67	9,18	9,73
21	6,40	6.87	7,33	7,78	8,27	8,77	9,30
22	6,08	6.58	6,97	7,40	7,87	8,35	8,85
23	5,77	6.20	6,62	7,01	7,47	7,92	8,40
24	5,45	5.85	6,28	6,63	7,05	7,48	7,93
25	5,12	5.50	5,87	6,23	6,63	7,03	7,45
26	4,78	5.15	5,48	5,83	6,20	6,57	6,98
27	4,45	4.78	5,10	5,42	5,77	6,12	6,48
28	4,12	4.42	4,72	5,00	5,32	5,65	5,98
29	3,77	4.03	4,32	4,57	4,70	5,17	5,43
30	3,40	3.65	3,90	4,13	4,40	4,67	4,97
31	3,05	3.27	3,48	3,68	3,93	4,17	4,43
32	2,67	2.87	3,05	3,23	3,45	3,65	3,88

Latitude of 51 deg. 53 parts.

Positiō.	15	16	17	18	19	20	21
32	21,93	23,50	25,08	26,67	28,28	29,95	31,65
31	21,57	23,10	24,65	26,21	27,80	29,43	31,10
30	21,20	22,71	24,23	25,77	27,33	28,93	30,57
29	20,83	22,33	23,82	25,33	27,03	28,48	30,05
28	20,48	21,95	23,42	24,90	26,42	27,92	29,55
27	20,15	21,58	23,03	24,43	25,97	27,48	29,05
26	19,82	21,22	22,65	24,07	25,53	27,03	28,55
25	19,48	20,87	22,27	23,67	25,10	26,57	28,08
24	19,15	20,52	21,88	23,27	24,68	26,12	27,77
23	18,83	20,17	21,52	22,80	24,27	25,68	27,13
22	18,52	19,78	21,17	22,50	23,87	25,25	26,68
21	18,20	19,50	20,80	22,12	23,47	24,83	26,23
20	17,90	19,17	20,45	21,7	23,07	24,42	25,80
19	17,60	18,85	20,12	21,37	22,68	24,00	25,37
18	17,30	18,53	19,77	21,02	22,28	23,58	24,93
17	17,00	18,22	19,43	20,65	21,90	23,18	24,50
16	16,70	17,90	19,10	20,30	21,53	22,78	24,08
15	16,42	17,53	18,77	19,95	21,17	22,40	23,67
14	16,13	17,28	18,43	19,60	20,78	22,00	23,27
13	15,85	16,98	18,12	19,25	20,43	21,62	22,85
12	15,57	16,68	17,80	18,92	20,07	21,23	22,45
11	15,28	16,38	17,47	18,57	19,70	20,85	22,05
10	15,00	16,08	17,15	18,23	19,35	20,48	21,65
9	14,73	15,78	16,85	17,90	19,00	20,10	21,25
8	14,45	15,50	16,53	17,57	18,63	19,73	20,87
7	14,25	15,20	16,22	17,23	18,28	19,37	20,47
6	13,92	14,92	15,90	16,90	17,93	19,00	20,08
5	13,65	14,62	15,60	16,58	17,60	18,62	19,68
4	13,37	14,33	15,30	16,25	17,25	18,25	19,30
3	13,18	14,05	14,98	15,93	16,90	17,90	18,92
2	12,83	13,75	14,68	15,60	16,55	17,53	18,53
1	12,57	13,47	14,37	15,27	16,22	17,17	18,15
0	12,30	13,18	14,07	14,95	15,87	16,80	17,77

South Declination under the Earth, and North above it.

A Table of Positions for the

Pole of	22	23	24	25	26	27	28
0	18,73	19,73	20.72	21.75	22.93	23,72	25,00
1	18,33	19,32	20.27	21.28	22.45	23,20	24,47
2	17,92	18,88	19.83	20.82	21.95	22,70	23,93
3	17,52	18,45	19.38	20.35	21.47	22,18	23,40
4	17,12	18,03	18.93	19.88	20.98	21,67	22,87
5	16,70	17,60	18.48	19.42	20.48	21,17	22,33
6	16,30	17,18	18.03	18.93	20.00	20,65	21,80
7	15,88	16,75	17.58	18.47	19.50	20,13	21,25
8	15,48	16,32	17.13	18.00	19.00	19,62	20,72
9	15,07	15,88	16.67	17.52	18.50	19,08	20,17
10	14,65	15,43	16.22	17.03	18.00	18,57	19,62
11	14,23	15,00	15.75	16.55	17.50	18,03	19,07
12	13,80	14,55	15.28	16.07	16.98	17,50	18,52
13	13,38	14,10	14.82	15.57	16.47	16,97	17,95
14	12,95	13,65	14.35	15.07	15.95	16,42	17,38
15	12,52	13,20	13.87	14.57	15.42	15,87	16,82
16	12,08	12,75	13.38	14.07	14.88	15,32	16,23
17	11,63	12,28	12.90	13.55	14.35	14,75	15,65
18	11,18	11,80	12.40	13.03	13.82	14,18	15,05
19	10,73	11,33	11.90	12.52	13.27	13,62	14,45
20	10,28	10,85	11.40	11.98	12.70	13,03	13,85
21	9,82	10,35	10.88	11.43	12.15	12,60	13,23
22	9,33	9,85	10.35	10.88	11.55	11,83	12,60
23	8,85	9,35	9.82	10.33	10.98	11,23	11,95
24	8,37	8,83	9.28	9.77	10.38	10.60	11,30
25	7,87	8,32	8.73	9.18	9.78	9,97	10,65
26	7,37	7,78	8.17	8.60	9.17	9,33	9,97
27	6,85	7,25	7.60	8.00	8.55	8,69	9,28
28	6,33	6,68	7.02	7.40	7.90	8,00	8,58
29	5,80	6,12	6.43	6.82	7.25	7,32	7,90
30	5,25	5,55	5.82	6.13	6.58	6,62	7,12
31	4,68	4,95	5.20	5.48	5.90	5,88	6,37
32	4,12	4,35	4.57	4.82	5.18	5,15	5,60

North Declination under the Earth, and South above it.

Latitude of 51 deg. 53 parts.

South Declination under the Earth, and North above it.

Positiõ.	22	23	24	25	26	27	28
32	33. 35	34, 95	36, 87	38, 68	40, 68	42, 28	44, 40
31	32. 78	34, 52	36, 23	38, 02	39, 97	41, 55	43, 63
30	32. 22	33, 92	35, 62	37, 37	39, 28	40, 82	42, 88
29	31. 67	33, 35	35, 00	36, 73	38, 62	40, 12	42, 13
28	31. 13	32, 78	34, 42	36, 10	37, 97	39, 43	41, 42
27	30. 62	32, 22	33, 83	35, 50	37, 32	38, 77	40, 72
26	30. 10	31, 68	33, 27	34, 90	36, 70	38, 10	40, 03
25	29. 60	31, 15	32, 70	34, 32	36, 08	37, 47	39, 35
24	29. 10	30, 63	32, 15	33, 73	35, 48	36, 83	38, 70
23	28. 62	30, 12	31, 62	33, 17	34, 88	36, 20	38, 05
22	28. 13	29, 62	31, 08	32, 62	34, 30	35, 60	37, 40
21	27. 65	29, 12	30, 55	32, 07	33, 72	35, 00	36, 77
20	27. 18	28, 62	30, 03	31, 52	33, 17	34, 40	36, 15
19	26. 73	28, 13	29, 53	30, 98	32, 60	33, 82	35, 55
18	26. 28	27, 67	29, 03	30, 27	32, 05	33, 25	34, 95
17	25. 80	27, 18	28, 53	29, 95	31, 52	32, 68	34, 35
16	25. 38	26, 72	28, 05	29, 43	30, 98	32, 12	33, 77
15	24. 95	26, 27	27, 57	28, 93	30, 45	31, 57	33, 18
14	24. 52	25, 82	27, 08	28, 43	29, 92	31, 02	32, 62
13	24. 08	25, 37	26, 62	27, 93	29, 40	30, 47	32, 05
12	23. 67	24, 92	26, 15	27, 43	28, 88	29, 93	31, 48
11	23. 23	24, 47	25, 68	26, 95	28, 37	29, 40	30, 93
10	22. 82	24, 03	25, 23	26, 47	27, 87	28, 87	30, 38
9	22. 40	23, 58	24, 77	25, 98	27, 37	28, 35	29, 83
8	21. 98	23, 15	24, 30	25, 50	26, 87	27, 82	29, 28
7	21. 58	22, 72	23, 85	25, 03	26, 37	27, 30	28, 75
6	20. 17	22, 28	23, 40	24, 57	25, 87	26, 78	28, 20
5	20. 77	21, 87	22, 95	24, 08	25, 38	26, 27	27, 67
4	20. 35	21, 43	22, 50	23, 62	24, 88	25, 77	27, 13
3	19. 95	21, 02	22, 05	23, 15	24, 40	25, 25	26, 60
2	19. 55	20, 58	21, 77	22, 68	23, 92	24, 73	26, 07
1	19. 13	20, 15	21, 17	22, 22	23, 42	24, 23	25, 53
0	18. 73	19, 73	20, 72	21, 75	22, 93	23, 72	25, 00

A Table of Positions for the

Pole of	29	30	31	32	33	34	35
0	26,13	27,20	28,52	29,77	30,97	32,49	33,82
1	25,58	26,72	27,92	29,15	30,42	31,73	33,12
2	25,02	26,15	27,32	28,52	29,77	31,05	32,42
3	24,47	25,57	26,72	27,88	29,12	30,37	31,72
4	23,92	24,98	26,11	27,27	28,47	29,70	31,01
5	23,35	24,23	25,50	26,63	27,82	29,02	30,30
6	22,80	23,82	24,90	26,00	27,15	28,33	29,60
7	22,23	23,23	24,28	25,37	26,50	27,65	28,88
8	21,67	22,65	23,67	24,73	25,83	26,97	28,17
9	21,10	22,05	23,05	24,08	25,17	26,27	27,45
10	20,52	21,48	22,43	23,43	24,48	25,57	26,72
11	19,95	20,85	21,82	22,78	23,82	24,87	26,00
12	19,37	20,25	21,18	22,13	23,13	24,15	25,25
13	18,78	19,63	20,55	21,47	22,45	23,43	24,52
14	18,20	19,02	19,90	20,80	21,75	22,72	23,77
15	17,60	18,40	19,25	20,13	21,13	22,98	23,00
16	17,00	17,77	18,60	19,45	20,33	21,25	22,23
17	16,38	17,13	17,93	18,75	19,60	20,50	21,45
18	15,75	16,48	17,25	18,05	18,88	19,73	20,67
19	15,13	15,83	16,58	17,35	18,15	18,97	19,87
20	14,50	15,17	15,88	16,62	17,40	18,18	19,05
21	13,85	14,50	15,18	15,88	16,63	17,40	18,17
22	13,20	13,82	14,47	15,15	15,85	16,25	17,37
23	12,52	13,12	13,73	14,38	15,07	15,77	16,53
24	11,85	12,40	13,00	13,62	14,27	14,92	15,65
25	11,15	11,68	12,25	12,83	13,43	14,07	14,77
26	10,45	10,95	11,48	12,02	12,60	13,20	13,85
27	9,57	10,20	10,68	11,20	11,75	12,30	12,92
28	9,00	9,25	9,88	10,37	10,87	11,38	11,97
29	8,23	8,63	9,07	9,50	9,97	10,45	10,98
30	7,47	7,83	8,22	8,62	8,05	9,48	9,97
31	6,68	7,00	7,35	7,55	7,10	8,48	8,93
32	5,87	6,15	6,47	6,78	6,13	7,63	7,87

North Declination under the Earth, and South above it.

Latitude of 51 deg. 53 parts.

Position	29	30	31	32	33	34	35
32	46, 40	48, 45	50. 57	52, 75	55, 00	57, 17	59, 77
31	45, 58	47, 60	49. 68	51, 82	54, 03	56, 32	58, 70
30	44, 80	46, 77	48. 82	50, 92	53, 08	55, 32	57, 67
29	44, 03	45, 97	47. 97	50, 03	52, 17	54, 68	56, 65
28	43, 27	45, 18	47. 15	49, 17	51, 27	53, 42	55, 67
27	42, 53	44, 40	46. 35	48, 33	50, 38	52, 50	54, 72
26	41, 82	43, 65	45. 55	47, 52	49, 53	51, 60	53, 78
25	41, 12	42, 92	44. 78	46, 70	48, 70	50, 73	52, 87
24	40, 42	42, 20	44. 03	45, 87	47, 87	49, 88	51, 98
23	39, 75	41, 48	43. 30	45, 07	47, 07	49, 03	51, 10
22	39, 07	40, 78	42. 57	44, 27	46, 27	48, 22	50, 27
21	38, 42	40, 10	41. 85	43, 50	45, 50	47, 40	49, 47
20	37, 77	39, 43	41. 15	42, 79	44, 73	46, 62	48, 58
19	37, 13	38, 77	40. 45	42, 98	43, 98	45, 83	47, 77
18	36, 52	38, 12	39. 78	41, 25	43, 25	45, 07	46, 97
17	35, 88	37, 47	39. 10	40, 52	42, 52	44, 30	46, 18
16	35, 27	36, 83	38. 43	40, 80	41, 80	43, 55	45, 40
15	34, 67	36, 20	37. 78	39, 08	41, 08	42, 82	44, 63
14	34, 07	35, 58	37. 13	38, 38	40, 38	42, 08	43, 87
13	33, 48	34, 97	36. 48	38, 68	39, 68	41, 37	43, 12
12	32, 90	34, 35	35. 85	37, 00	39, 00	40, 65	42, 38
11	32, 32	33, 75	35. 22	36, 31	38, 32	39, 93	41, 63
10	31, 75	33, 15	34. 60	36, 65	37, 65	39, 23	40, 92
9	31, 17	32, 55	33. 98	35, 97	36, 97	38, 53	40, 18
8	30, 60	31, 95	33. 37	34, 30	36, 30	37, 67	39, 47
7	30, 03	31, 37	32. 92	34, 63	35, 63	37, 15	38, 75
6	29, 47	30, 78	32. 13	33, 98	34, 98	36, 47	38, 03
5	28, 92	30, 20	31. 53	32, 32	34, 32	35, 78	37, 33
4	28, 35	29, 62	30. 92	32, 67	33, 67	35, 10	36, 62
3	27, 80	29, 03	30. 32	31, 01	33, 02	34, 43	35, 92
2	27, 25	28, 45	29. 72	30, 37	32, 37	33, 75	35, 22
1	26, 68	27, 88	29. 12	30, 72	31, 71	33, 07	34, 51
0	26, 13	27, 30	28. 52	29, 07	31, 07	32, 40	33, 81

South Declination under the Earth, And North above it.

A Table of Positions for the

Pole of	36	37	38	39	40	41	42
0	35,27	36,78	38,38	40,07	41,82	43,70	45,68
1	34,53	36,02	37,60	39,25	40,98	42,83	44,78
2	33,82	35,10	36,82	38,45	40,13	41,97	43,88
3	33,08	34,52	36,03	37,63	39,30	41,08	42,98
4	32,35	33,77	35,25	36,82	38,45	40,22	42,05
5	31,62	33,00	34,47	36,00	37,60	39,33	41,17
6	30,88	32,23	33,67	35,20	36,75	38,45	40,25
7	30,15	31,47	32,88	34,37	35,90	37,57	39,33
8	29,40	30,70	32,08	33,53	35,05	36,68	38,42
9	28,67	29,93	31,28	32,78	34,18	35,78	37,48
10	27,90	29,15	30,47	31,85	33,32	34,88	36,55
11	27,15	28,37	29,65	31,02	32,43	33,97	35,60
12	26,38	27,57	28,82	30,15	31,55	33,05	34,65
13	25,67	26,77	27,98	29,30	30,65	32,12	33,68
14	24,83	25,95	27,15	28,42	29,78	31,18	32,72
15	24,03	25,13	26,30	27,37	28,82	30,23	31,72
16	23,07	24,30	25,43	26,63	27,90	29,27	30,71
17	22,43	23,47	24,57	25,73	26,95	28,28	29,70
18	21,62	22,62	23,68	24,82	26,00	27,30	28,67
19	20,78	21,75	22,78	23,88	25,01	26,28	27,62
20	19,93	20,87	21,87	22,93	24,03	25,25	26,55
21	19,07	19,97	20,93	21,95	23,03	24,20	25,47
22	18,18	19,05	19,98	20,97	22,00	23,13	24,35
23	17,30	18,13	19,01	19,97	20,78	22,05	23,22
24	16,40	17,18	18,03	18,93	19,72	20,93	22,05
25	15,47	16,22	17,01	17,88	18,78	19,78	20,85
26	14,51	15,22	15,98	16,80	17,65	18,62	19,63
27	13,58	14,03	14,92	15,70	16,50	17,42	18,38
28	12,38	13,10	13,83	14,57	15,32	16,18	17,08
29	11,52	12,10	12,72	13,40	14,10	14,95	15,75
30	10,47	11,00	12,57	11,20	12,83	13,58	14,37
31	9,38	9,87	10,38	10,95	11,53	12,22	12,93
32	8,27	8,70	9,17	9,17	10,30	10,80	11,45

North Declination under the Earth, and South above it.

Latitude of 51 deg. 53 parts.

Position	36	37	38	30	40	41	42
32	62,27	64,87	67,60	70.97	73,33	76,60	79,92
31	61,15	63,70	66,38	69.18	72,10	75,18	78,43
30	60,07	62,57	65,20	67.93	70,80	73,42	77,00
39	59,01	61,47	64,05	66.73	69,53	72,50	75,63
28	57,98	60,40	62,93	65.57	68,32	71,22	74,28
27	57,00	59,37	61,85	64.43	67,30	69,93	72,98
26	56,02	58,35	60,78	63.33	65,98	68,78	71,73
25	55,07	57,35	59,73	62.25	64,85	67,62	70,52
24	54,13	56,38	58,73	61.20	63,75	66,47	69,32
23	53,23	55,43	57,75	60.17	62,68	65,35	68,15
22	52,35	54,52	56,78	59.17	61,63	64,27	67,01
21	51,47	53,63	55,83	58.18	60,60	63,20	65,90
20	50,60	52,70	54,90	57.20	59,60	62,15	64,82
19	49,75	51,82	53,98	56.25	58,62	61,12	63,75
18	48,92	50,95	53,08	55.32	57,63	60,10	62,70
17	48,10	50,10	52,20	54.40	56,68	59,12	61,67
16	47,30	49,27	51,33	53.50	55,90	58,13	60,65
15	46,50	48,43	50,47	52.60	54,82	57,17	59,65
14	45,70	47,62	49,62	51.71	53,90	56,22	58,66
13	44,87	46,80	48,78	50.83	52,98	55,28	57,68
12	44,15	46,00	47,95	49.98	52,08	54,35	56,72
11	43,38	45,20	47,12	49.12	51,20	53,43	55,77
10	43,63	44,42	46,30	48.28	50,32	52,52	54,82
9	41,87	43,63	45,48	47.43	49,45	51,62	53,88
8	41,13	42,87	44,68	46.60	48,58	50,72	52,95
7	40,38	42,10	43,88	45.77	47,90	49,83	52,03
6	39,65	41,33	43,10	44.93	46,88	48,95	51,12
5	38,92	40,57	42,30	44.13	45,03	48,07	50,20
4	38,18	39,80	41,52	43.32	45,18	47,18	49,30
3	37,45	39,05	40,73	42.50	44,33	46,32	48,38
2	36,72	38,30	39,95	41.68	43,50	45,43	47,48
1	36,00	37,53	39,17	41.88	42,65	44,57	46,58
0	35,27	36,78	38,38	40.07	41,82	43,70	45,68

South Declination under the Earth, And North above it.

A Table of Positions for the

North Declination under the Earth, and South above it.

Pole of	43	44	45	46	47	48	49
0	47,80	50,12	52,60	55,32	58,40	61,93	66,05
1	46,87	49,15	51,60	54,28	57,33	60,82	64,90
2	45,93	48,18	50,59	53,25	56,25	59,72	63,75
3	45,00	47,22	49,59	52,20	55,18	58,60	62,60
4	44,07	46,25	48,58	51,17	54,10	57,48	61,43
5	43,12	45,27	47,58	50,12	53,02	56,35	60,27
6	42,18	44,28	46,57	49,07	51,93	55,23	59,10
7	41,23	43,30	45,55	48,02	50,83	54,10	57,93
8	40,27	42,31	44,52	46,95	49,73	52,95	56,42
9	39,30	41,32	43,48	45,88	48,62	51,68	55,55
10	38,33	40,31	42,45	44,80	47,33	50,6	54,35
11	37,35	39,30	41,38	43,70	46,37	49,47	53,13
12	36,37	38,27	40,33	42,60	45,22	48,28	51,90
13	35,37	37,23	39,25	41,48	44,07	47,08	50,65
14	34,35	36,18	38,17	40,35	41,90	45,25	49,38
15	33,33	35,12	37,07	39,20	41,70	44,62	48,10
16	32,28	34,03	35,77	38,05	40,50	43,37	46,78
17	31,23	32,95	34,80	36,87	39,27	42,08	45,45
18	30,17	31,83	33,63	35,65	38,02	40,78	44,10
19	29,07	30,70	32,45	34,43	36,73	39,45	42,72
20	27,97	29,53	31,25	33,18	35,43	38,08	41,30
21	26,80	28,18	30,03	31,90	34,18	36,70	39,85
22	25,67	27,15	28,77	30,58	33,73	35,27	38,35
23	24,48	25,92	27,48	29,23	31,32	33,80	36,82
24	23,27	24,65	26,17	27,87	29,88	32,30	35,98
25	22,02	23,35	24,80	26,45	28,40	30,73	33,62
26	20,75	22,02	23,42	24,98	26,87	29,13	31,92
27	19,47	20,63	21,97	23,47	25,28	27,47	30,17
28	18,07	19,22	20,48	21,90	23,30	25,73	28,33
29	16,67	17,75	18,93	20,28	21,93	23,93	26,43
30	15,05	16,23	17,33	18,60	20,15	22,05	24,43
31	13,83	14,65	15,67	16,83	18,28	20,07	22,32
32	12,17	13,00	13,93	15,00	16,33	17,98	20,43

Latitude of 51 deg. 53 parts.

South Declination under the Earth, and North above it.

Position	43	44	45	46	47	48	49
32	83,43	87,23	91,27	95,63	100,47	106,88	112,00
31	82,77	85,58	89,53	93,80	98,52	105,80	109,78
30	80,38	84,00	87,87	92,03	96,65	101,82	107,67
29	78,93	82,48	86,27	90,35	94,87	99,93	105,67
28	77,53	81,02	84,72	88,73	93,17	98,13	103,77
27	76,17	80,60	83,23	87,17	91,52	96,40	101,93
26	74,85	78,22	81,78	85,65	89,63	94,73	100,18
25	73,58	76,88	80,40	84,18	88,40	93,13	98,48
24	72,33	75,58	79,03	82,77	86,92	91,57	96,12
23	71,12	74,22	77,72	81,40	85,48	90,07	95,28
22	69,93	73,08	76,43	80,05	84,07	88,60	93,75
21	68,78	71,83	75,17	78,73	82,70	87,17	92,25
20	67,63	70,70	73,95	77,45	81,37	85,78	90,80
19	66,53	69,53	72,75	76,20	80,07	84,42	89,37
18	65,43	68,40	71,57	74,98	78,78	83,08	88,00
17	64,37	67,28	70,40	73,77	77,53	81,78	86,65
16	63,32	66,20	69,27	72,58	76,30	80,50	85,32
15	62,27	65,12	68,13	71,43	75,10	79,25	84,00
14	61,25	64,05	67,03	70,28	73,90	78,02	82,72
13	60,23	63,00	65,95	69,15	72,73	76,78	81,45
12	59,23	61,97	64,87	68,03	71,58	75,58	80,20
11	58,25	60,93	63,87	66,93	70,43	74,40	78,97
10	57,27	59,92	62,75	65,83	69,30	73,23	77,75
9	56,30	58,91	61,72	64,75	68,18	72,07	76,55
8	55,33	57,92	60,68	63,68	67,07	70,92	75,35
7	54,37	56,93	59,65	62,62	65,97	69,73	74,17
6	53,42	55,95	58,63	61,57	64,87	68,63	73,00
5	52,48	54,85	57,62	60,52	63,78	67,50	71,83
4	51,53	53,98	56,61	59,47	62,70	66,38	70,67
3	50,60	53,01	55,60	58,43	61,62	65,27	69,50
2	49,67	52,05	54,60	57,41	60,53	64,15	68,35
1	48,73	51,08	53,60	56,35	59,47	63,05	67,20
0	47,80	50,12	52,60	55,32	58,40	61,93	66,05

A Table of Positions for the

North Declination under the Earth, and South above it.

Pole of	50	51	51. 53
0	71,23	78.83	90,00
1	70,03	77.60	88,08
2	68,85	76.37	87,48
3	67,65	75.12	86,22
4	66,45	73.88	84,97
5	65,40	72.63	83,68
6	64,03	71.38	82,40
7	62,82	70.12	81,12
8	61,60	68.83	79,82
9	60,35	67.55	78,50
10	59,10	66.25	77,18
11	57,83	64.95	75,85
12	56,57	63.53	74,48
13	55,27	62.27	73,12
14	53,95	60.90	71,72
15	52,58	59,52	70,39
16	51,25	58.10	68,85
17	49,87	56.65	67,37
18	48,45	54.18	65,87
19	47,00	53.67	64,32
20	45,53	52.12	62,73
21	44,00	50.53	61,12
22	42,45	48.90	59,43
23	40,85	47.22	57,72
24	39,18	45.48	55,92
25	37,47	43.67	54,07
26	35,70	41.80	52,13
27	33,85	39.83	50,12
28	31,92	37.80	48,00
29	29,88	35.63	45,77
30	27,75	33.35	43,38
31	25,30	30.93	40,87
32	23,10	28.33	38,13

South Declination under Earth, and North above it.

Posit iō	50	51	51. 53
32	119,33	129,33	141,87
31	116,97	126,73	139,13
30	114,72	124,32	136,62
29	112,58	122,00	134,23
28	110,55	119,87	132,00
27	108,62	117,83	129,88
26	106,73	115,87	127,87
25	105,00	114,00	125,93
24	103,28	112,18	124,08
23	101,62	110,45	122,28
22	100,02	108,77	12 ,57
21	98,47	107,13	118,88
20	96,93	105,55	117,27
19	95,47	104,00	115,68
18	94,02	102,48	114,13
17	92,60	101,02	11 ,63
16	91,22	99,57	111,15
15	89,88	98,15	109,70
14	88,52	96,77	108,28
13	87,20	95,40	106,88
12	85,90	94,05	105,52
11	84,63	92,72	104,15
10	83,32	91,42	102,82
9	82,12	90,12	101,50
8	80,92	88,83	100,18
7	79,65	87,55	98,88
6	78,43	86,28	97,60
5	77,07	85,03	96,32
4	76,02	83,78	95,03
3	74,82	82,55	93,78
2	73,62	81,30	92,52
1	72,43	80,00	91,92
0	71,23	78,83	90,00

A Table ſhewing the Elevation of the Pole upon the ſeveral circles of Poſition of the 11, 12. 2, and 3. Houſes for 60 degrees of Latitude.

Latitude	11 & 3 Poles Elevat.	12 & 2 Poles Elevat.	Latitude	11 & 3 Poles Elevat.	12 & 2 Poles Elevat.
1	0, 48	0, 85	31	16, 73	27. 48
2	0, 98	1, 72	32	17, 35	28. 42
3	1, 48	2, 58	33	17, 98	29. 35
4	1, 98	3, 45	34	18, 63	30. 28
5	2, 48	4, 32	35	19, 30	31. 22
6	3, 00	5, 18	36	19, 97	32. 18
7	3, 52	6, 07	37	20, 65	33. 13
8	4, 03	6, 95	38	21, 33	34. 08
9	4, 53	7, 82	39	22, 03	35. 03
10	5, 05	8, 68	40	22, 75	36. 00
11	5, 57	9, 55	41	23, 48	36. 97
12	6, 08	10, 43	42	24, 23	37. 95
13	6, 60	11, 30	43	25, 00	38. 93
14	7, 12	12, 18	44	25, 78	39. 92
15	7, 63	13, 07	45	26, 57	40. 90
16	8, 15	13, 95	46	27, 37	41. 89
17	8, 68	14, 83	47	28, 18	42. 88
18	9, 22	15, 72	48	29, 03	43. 89
19	9, 75	16, 60	49	29, 90	44. 90
20	10, 30	17, 50	50	30, 78	45. 92
21	10, 85	18, 38	51	31, 68	46. 93
22	11, 42	19, 28	51. 53	32, 18	47. 47
23	11, 63	20, 18	52	32, 62	47. 95
24	12, 53	21, 08	53	33, 57	48. 98
25	13, 12	21, 99	54	34, 53	50. 01
26	13, 70	22, 89	55	35, 53	51. 05
27	14, 30	23, 80	56	36, 55	52. 08
28	14, 90	24, 71	57	37, 58	53. 13
29	15, 50	25, 63	58	38, 65	54. 18
30	16, 12	26, 55	59	39, 75	55. 23
31	16, 73	27, 48	60	40, 88	56. 30

A general Table of Positions.

The Poles Elevation upon every circle of Position.	55	54	53	52	51.53	51	50
1	0,70	0,73	0,75	0,78	0,79	0,02	0,83
2	1,40	1,45	1,50	1,57	1,58	1,62	1,68
3	2,00	2,18	2,27	2,35	2,38	2,43	2,52
4	2,80	2,92	3,03	3,13	3,17	3,25	3,37
5	3,51	3,65	3,78	3,92	3,98	4,07	4,22
6	4,22	4,38	4,55	4,71	4,80	4,88	5,07
7	4,83	5,12	5,32	5,50	5,62	5,70	5,92
8	5,65	5,87	6,08	6,30	6,45	6,53	6,77
9	6,37	6,60	6,85	7,10	7,22	7,37	7,63
10	7,10	7,37	7,63	7,92	8,05	8,22	8,50
11	7,82	8,12	8,42	8,73	8,88	9,05	9,38
12	8,57	8,88	9,22	9,57	9,73	9,92	10,27
13	9,30	9,65	10,02	10,40	10,57	10,77	11,17
14	10,05	10,43	10,83	11,23	11,43	11,65	12,08
15	10,82	11,23	11,65	12,08	12,30	12,53	13,00
16	11,58	12,02	12,48	12,95	13,18	13,43	13,92
17	12,37	12,83	13,32	13,82	14,07	14,30	14,87
18	13,15	13,65	14,17	14,70	14,95	15,25	15,82
19	13,95	14,48	15,03	15,60	15,87	16,18	16,80
20	14,77	15,33	15,92	16,52	16,80	17,13	17,78
21	15,60	16,20	16,82	17,45	17,77	18,12	18,78
22	16,43	17,07	17,73	18,40	18,73	19,10	19,82
23	17,28	17,97	18,65	19,37	19,73	20,10	20,87
24	18,32	18,87	19,60	20,35	20,72	21,13	21,93
25	19,05	19,80	20,57	21,37	21,75	22,18	23,03
26	19,97	20,75	21,57	22,40	21,93	23,27	24,15
27	20,90	21,72	22,58	23,47	23,72	24,37	25,32
28	21,85	22,72	23,62	24,55	25,00	25,50	26,50
29	22,65	23,75	24,68	25,67	26,13	26,67	27,72
30	23,85	24,80	25,78	26,82	27,30	27,87	28,98
31	24,88	25,88	26,92	28,00	28,52	29,12	30,28
32	25,95	27,00	28,08	29,22	29,77	30,40	31,62

A general Table of Positions.

The Poles elevation upon every circle of Position.

	55	54	53	52	51, 53	51	50
33	27. 05	28, 15	29, 30	30, 48	31, 08	31, 73	33, 02
34	28. 18	29, 35	30, 55	31, 80	32, 40	33, 10	34, 47
35	29. 37	30, 58	31, 85	33, 17	33, 48	34, 55	35, 98
36	30. 58	31, 87	33, 20	34, 58	35, 27	36, 03	37, 57
37	31. 85	33, 20	34, 60	36, 07	36, 78	37, 60	39, 22
38	33. 17	34, 58	36, 07	37, 62	38, 38	39, 25	40, 97
39	34. 55	36, 03	37, 60	39, 25	40, 07	40, 98	42, 80
40	35. 98	37, 57	39, 22	40, 97	41, 48	42, 80	44, 75
41	37. 50	39, 17	40, 75	42, 78	43, 70	44, 75	46, 83
42	39. 08	40, 85	42, 73	44, 70	45, 68	46, 82	49, 07
43	40. 77	42, 65	44, 65	46, 77	47, 80	49, 03	51, 48
44	42. 55	44, 55	46, 70	48, 98	50, 12	51, 45	54, 13
45	44. 45	46, 60	48, 90	51, 38	52, 60	54, 07	57, 05
46	46. 48	48, 80	51, 28	54, 00	55, 32	56, 98	60, 33
47	48. 67	51, 18	53, 92	56, 92	58, 40	59, 27	64 13
48	51. 05	53, 80	56, 82	60, 20	61, 60	64, 07	68, 73
49	53. 67	56, 70	60, 10	64, 00	66, 05	68, 68	74, 85
50	56. 57	59, 98	63, 90	68, 62	71, 23	74, 82	90, 00
51	59. 85	63, 80	68, 53	74, 75	78, 83	90, 00	
52	63. 67	68, 42	74, 70	90, 00	90, 0		
53	68. 32	74, 62	90, 00				
54	74, 53	90, 00					
55	90						

A Catalogue of the more notable Fixed Stars, with their Longitude, Latitude, and Magnitude, for the yeare 1650 Compleat.

About the North Pole.

Names of the Stares.	Longit. D. Parts	Latit. D. Parts.		Mag.
The Polar Star	♓ 23,74916	66,04167	N	2
The higher of the 2 in □ of them that precede of the lesser Bear	♑ 7,98250	72,85000	N	2
The lower of the same	♑ 15,39183	75,38333	N	3
That neerest the Pole.	♓ 27,20750	63,91667	N	6
The higher preceding in □ of the greater Bear	♑ 10,17417	49,66667	N	2
The lower of the same	♑ 14,43250	45,75000	N	2
The higher of those following of the Quadrat	♑ 26,13250	51,61667	N	2
The lower of the same	♑ 25,45750	47,10000	N	2
The last but two in the taile	♍ 3,87417	54,30000	N	2
The last but one in the taile	♍ 10,64917	56,36667	N	2
The last in the taile	♍ 21,90750	54,41667	N	2
The tongue of the Dragon	♏ 18,64917	76,28333	N	4
The bright Star in the head	♉ 17,77417	81,88333	N	5
The Girdle of *Cepheus*	♉ 0,99417	71,11667	N	3
Arcturus	♎ 19,35[illegible]	[illegible],04167	N	1
The bright Star of the Crown	♍ 7,34917	44,18333	N	2
The head of *Hercules*	♐ 11,22417	37,38333	N	3
The bright Star of the Harp	♑ 10,41417	61,78333	N	1
The bright Star of the Swan, in the breast of *Cassiopeia*	♓ 0,59917	59,93333	N	2
The head of *Medusa*	♉ 2,99917	46,58333	N	3
In the the right side of *Perseus*	♉ 21,32417	22,37500	N	3
The little Goat *Capella*	♊ 26,99083	30,08333	N	2
In the head of *Ophiuchus*	♊ 16,96417	22,84167	N	2
	♐ 17,54083	35,95000	N	3

Names of the Starres.	Longit. D. Parts	Latit. D. Parts.		Mag.
In the middle of the Serpents neck.	♐ 15,20750	25,98333	N	2
The bright Starre in the shoulder of the Eagle	♑ 26,85750	29,35833	N	2
The bright Starre of the taile of the Dolphin	♒ 9,04083	29,13333	N	3
The Mouth of *Pegasus*	♒ 27,07417	22,12500	N	5
The first Star of the wing *Pegasus*	♓ 28,64917	19,43333	N	2
In the putting forth of the thigh of *Pegasus*			N	
	♓ 24,92417	11,11667	N	2
The head of *Andromeda*	♈ 9,49083	25,70000	N	2
The more Southern in the Girdle	♈ 25,52417	25,98333	N	2
In the South foot *Andromeda*	♉ 9,15750	27,77500	N	2
In the top of the Triangle	♉ 2,02417	16,82500	N	4

About the Zodiack.

The first Star of *Aries*	♈ 28,22417	7.13333	N	4
The bright Starre in the top of the head of *Aries*	♉ 2,80750	9.95000	N	3
The South Eye of *Taurus*	♊ 4,91583	5.11667	S	1
The north Eye of *Taurus*	♊ 3,69083	2.60833	S	3
The bright Star of the *Pleiades*	♉ 25,10750	4.00000	N	5
The higher head of *Gemini*	♋ 15,39083	10.03333	N	3
In the lower head of *Gemini*	♋ 18.42417	6.63333	N	3
Bright foot of *Gemini*	♋ 18,55750	6.80833	S	3
In the South Arm of *Cancer*	♌ 8,70583	5.13333	S	3
The bright Star in the neck of *Leo*	♌ 24,19083	8.78333	N	3
The Heart of *Leo*	♌ 24,99083	0.43333	N	2
In the extream of the taile of *Leo*	♍ 16,75750	12.30000	N	1
In *Virgo's* wing. *Vindemiatrix*	♎ 5,08083	16.25833	N	1
Virgins Spike	♎ 18,97417	1.98333	N	3
South Ballance	♏ 10,22417	0.43333	N	1
North Ballance	♏ 14,50750	8.58333	N	2
The highest in the fore-head of *Scorpio*	♏ 28,30750	1.08333	N	2
Scorpions heart	♐ 4,92417	4.45000	N	1

Names of the Starres.	Longit. D. Parts	Latit. D. Parts.		Mag.
Former of the 3. in the head of *Sagit.*	♈ 8,64917	1,40833	N	4
Northern in the former horn ♈	♈ 29,00750	7,04167	N	3
The ſucceeding bright Starre in the taile of *Capricorn*	♒ 18,70750	2,48333	S	3
The left ſhoulder of *Aquarius*	♒ 17,52417	8,70000	N	3
The ſhank of *Aquarius*	♓ 4,07417	8,16667	S	3
In the effuſion ♒ Fomahant	♒ 28,89917	22,00000	S	1
In the mouth of the ſouth Fiſh	♓ 13,74083	9,06667	N	5
The bright * in the joyning of both nets of *Piſces*	♈ 24,49083	9,06667	S	3

Towards the South Pole.

In the ſnout of the Whale	♉ 10,22417	7.83333	S	4
Bright * of the taile of the Whale	♓ 27,64083	20.78333	S	2
Bright ſhoulder of *Orion*	♊ 13,90750	16.10000	S	2
Middlemoſt of the Belt of *Orion*	♊ 18,60750	24.55833	S	2
Bright * in the left Foot *Orion*	♊ 11,99083	31.18333	S	1
Orions foot in the River	♊ 10,40750	27.90833	S	3
The laſt in the taile of the Hare	♊ 27,07417	38.43333	S	4
Great Dogs mouth. *Sirius*	♋ 9.29917	39.50000	S	1
Leſſer Dog. *Procyon*	♋ 21,01583	15.95000	S	2
In the top of the Ships ſtern	♌ 6,59917	43.30000	S	3
Brighteſt in *Hydra*	♍ 22,46583	22.40000	S	1

In the Southern Hemiſphere.

Brſght * of the Cranes head	♒ 12,56667	12.83333	S	2
Going out of the Cranes taile	♒ 17,5833	34.60000	S	2
Bright * of the Phœnix's neck	♓ 9,88333	40.16667	S	2
Head of *Indus*	♈ 28,30000	32.50000	S	4
The Peacocks head	♈ 17,45000	26.00000	S	2
The Sparrows head	♌ 19,01667	72.43333	S	5
In the bill of the Gooſe	♒ 4.60000	45.91667	S	3
The head of *Hydrus*	♓ 4,68333	64.08333	S	3

MVSEVM BRITAN NICVM

FINIS.